THE AMERICAN GAS LIGHT JOURNAL

PUBLISHING OFFICE No. 42 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION, HEATING, MECHANICAL, CHEMICAL AND GENERAL SCIENCE

VOLUME LXXVIII. No. 17. Whole No. 1,455. | NEW YORK, MONDAY, APRIL 27, 1903. | $3 PER ANNUM, IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. C. E. SANDERSON, Manager.
THOMAS J. CUNNINGHAM and ELBERT P. CALLENDER, Editors.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND-CLASS MATTER.

Published on each Monday of the year, at No. 42 Pine Street, New York.

Telephone.—2996 John.

The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

CONTENTS.

An Asterisk (*) denotes an illustrated article.

OFFICIAL NOTICES—
Twenty-sixth Annual Meeting, Western Gas Association..... 641
Wrinkle Department, Western Gas Association..... 641
EDITORIALS—
Briefly Told..... 641
No Municipal Lighting Plant—Notes.
CORRESPONDENCE—
A Fact Not a Fancy..... 642
An Enthusiastic Supporter..... 642
Nineteenth Annual Meeting, Ohio Gas Light Association—Official Report—Revised by the Secretary—Continued from page 613..... 642
First Day, Morning Session—Discussing the Progress Department—*The Question Box—Discussion thereon.
A Review of the Eighteenth Annual Report of the Massachusetts Board of Gas and Electric Light Commissioners—No. I..... 649
The Manufacturers and the Labor Question..... 651
SPECIAL ENGLISH CORRESPONDENCE..... 651
Natural Gas in Sussex—Mr. Shadbolt Discusses about Gas—Some Paragraphs on Lighting.
Reorganization of the Laclede Gas Company..... 652
ITEMS OF INTEREST FROM VARIOUS LOCALITIES..... 652
Contract for the Riter-Conley Company—A Characteristic Letter from Mr. F. H. Shelton—Office Removal—Death of Mr. A. V. Crawford—Allegheny (Pa.) County's New Gas Inspector—Gas Inspection Regulations, Wilmington, Del.—Executive Management, Jackson, Mich—Annual Meeting, Amsterdam, N. Y.—Mr. T. D. Miller's Paper was the Feature of the Meeting—The Marshall (Mich.) Company Reorganized—Betterments at Elgin, Ills.—Annual Meeting, Rochester, N. Y.—And Other Items.
Success..... 653
The Market for Gas Securities..... 654

[OFFICIAL NOTICE.]

Twenty-sixth Annual Meeting, Western Gas Association.

OFFICE OF THE SECRETARY,
NEW ALBANY, IND., April 7th, 1903.

The annual meeting of the Western Gas Association will be held at the Claypool Hotel, Indianapolis, Ind., May 20, 21, 22, 1903, and will be called to order by its President, Mr. A. H. Barret, of Louisville, Ky., at 10 A.M., Wednesday, May 20.

Announcements as to rates will be made after the opening of the Claypool Hotel—it is entirely new, and has been in the course of construction for 2 years—which will occur between the 15th and 25th of April. Indianapolis is one of the best hotel towns in the country, and within a few blocks of the Claypool Hotel are a number of hotels conducted on the European and American plan, at which rates suitable to all persons can be secured.

The sessions of the Association will be held in a room provided by the Claypool Hotel.

The Executive Committee has arranged for the following papers:

Naphthaline, by Dr. W. H. Birchmore, Brooklyn, N. Y.

Gas and Meters, by Mr. John McIlhenny, Philadelphia, Pa.

The Most Economical Yield per Pound of Coal, by Mr. James Somerville, Indianapolis, Ind.

Increasing the Sale of Gas to Existing Customers, by Mr. B. W. Perkins, South Bend, Ind.

Municipal Ownership, by Mr. A. E. Boardman, New York City.

Heat Conductivity of the Different Clays, by Mr. Wheeler, St. Louis, Mo.

The High Pressure Gas Main under the Mississippi River at New Orleans, by Mr. Thos. D. Miller, New Orleans, La.

Low Candle Power Gas, by Capt. W. H. White, New York City.

Wrinkle Department, Edited by Mr. W. E. Steinwedell, Cleveland, O.

Reports will be made by the following committees: On Specifications for Gasholders; World's Fair Committee.

Arrangements are being made with the various Passenger Associations to secure the usual 1¼ rate for persons attending the convention, full details of which will be given shortly.

The Secretary will be pleased to answer any questions relating to the meeting, and will mail application blanks for membership to applicants. The membership fee is $10, which includes the first year's dues; annual dues $5 thereafter. The Association publishes and distributes, free of charge, to its members the Proceedings of the Association, which alone is worth more than the annual dues.

Yours truly,
JAS. W. DUNBAR, Sec'y.

[OFFICIAL NOTICE.]

Wrinkle Department, Western Gas Association.

WESTERN GAS ASSOCIATION,
OFFICE OF THE WRINKLE DEPARTMENT,
721 Citizens Building, Cleveland, O.

To the Members of the Western Gas Association: The Wrinkle Department is now ready to receive contributions for the 1903 collection, and I would thank you to please send a sketch or description of any new device or method you may have to the above address.

Any sketch, photograph or drawing, accompanied by a written explanation, of a new idea will be gratefully received, and it is hoped that you will comply promptly by favoring us with a contribution.

Respectfully,
W. E. STEINWEDELL,
Editor Wrinkle Department.

BRIEFLY TOLD.

NO MUNICIPAL LIGHTING PLANT.—Colonel Robert Grier Monroe's municipal lighting bill, which sought to establish primarily a municipally operated electric lighting plant for New York city, as most well-informed people thought would be the case, died in the Senate last Tuesday, when that august body, by a vote of 28 to 18, agreed to an adverse report on the proposition from the Senate Committee on Cities. Later on the Assembly treated the "Colonel's" plan in like manner. When *hic jacet sepultus* over the scheme was pronounced the "Colonel" sorrowfully remarked that he feared Tammany would, in the coming campaign that will precede the selection of a successor to Mayor Low, raise the slogan of a municipally conducted lighting plant as one of its strongest arguments for a return to favor. The "Colonel" forgets seemingly that that offspring, instead of being truly his own, was pretty well worked by Tammany in 1901, with Mr. Richard Croker as ts isponsor. No; the "Colonel" is not even original.

APR 27 1903
SMITHSONIAN DEPOSIT

NOTES.—

MR. W. J. LOGAN, of the Logan Iron Works, Brooklyn, N. Y., sailed for Europe last Saturday. He will return in 6 weeks.

MESSRS. JOHN J. GRIFFIN & CO., of Philadelphia, announce that they are now ready to fill orders from their own shops—1513 to 1521 Race street, Philadelphia—having quite overcome the severe damage that was caused them by fire last fall.

IT is believed that the plant of the Coast Gas Company, which is located in Belmar, N. J., at the junction of Sixteenth and Railroad avenues, will be in active operation by June 15th.

Correspondence

[The JOURNAL is not responsible for the opinions expressed by correspondents.]

A Fact Not a Fancy.

NEW YORK, April 22, 1903.

To the Editors AMERICAN GAS LIGHT JOURNAL:

The expenditure of the money subscribed by members of the Associations for printing literature valuable to them should not end with its delivery at the meetings to the members present, who take as many copies as they please, so depleting the supply that those not present cannot obtain a copy, even when written for. As each member is entitled to a copy of everything printed, it would seem strange that because he was not present at the meeting he should be deprived of the benefit coming from the payment of his dues. I would suggest that a reserve number be not only held for absentees, but mailed to them immediately after the meetings. Of course, we can depend on the JOURNAL; but that is not sufficient reason for each member not being provided with his number of the publications printed in advance of the meetings.

Yours truly, J. A. M.

An Enthusiastic Supporter.

LONG BRANCH, N. J., April 20, 1903.

To the Editors AMERICAN GAS LIGHT JOURNAL:

After reading the various remarks made by the opponents of the high pressure system, I cannot help saying a few things that may afford food for reflection.

Having studied for quite a time the utility of a high pressure system, I have found that it is the only solution of a great many problems that arise in supplying outlying districts. The greatest trouble in the gas business of to-day is to overcome silly prejudices; but whether or not that is so, high pressure has come to stay.

Mr. F. H. Shelton will find that all kinds of theoretical bricks will be thrown at him, and at the same time the very ones who are doing the throwing are doing the very thing that they are condemning—viz., the use of wrought iron pipe. Figures look pretty on paper, so do algebraic formulas worked out, but pressure is pressure, and that fact cannot be dealt a knock out by any formula that may be "worked out."

In New York, as everyone knows, they use trunk lines to distribute under low pressure, at an immense se cost of main and main maintainance, to points only 2 to 3 miles distant, while here 12 miles is thought nothing of to distribute by single main, and at a comparatively low pressure.

The trouble in the Camden-Trenton main was ignorance[1], pure and simple, or the want of proper expansion joints[1] at proper intervals. If a system is to be condemned for the acts of ignorance, then nothing can succeed, for in the gas business ignorance stalks abroad.

The question of pipe and method of laying seem to take up quite a bit of time. Of course, Mr. Shelton's scheme is a good one, to set his pipe in a bed of cement, but what is the use of all that trouble? If the pipe is laid properly and then given a coating of hot tar it will act as an insulator as well as a preservative.

I have seen a tar coated pipe that was in the ground for 12 years, that did not show any signs of decay. How much longer it would have remained there is a matter of conjecture. So much for the pipe. Now for the pressure and the pipe.

In every instance where cast iron pipe is used with caulked lead joints there will exist, even under moderately heavy pressures, enormous leakage. For instance, take the Long Branch Company on their pump lines, which carry only 20 inches pressure; they cannot keep their mains tight, while on wrought iron, screw-joints they have little or no trouble. Again, they only take the simple precaution of tar covering to prevent corrosion, and it fills its mission to the letter.

Trusting that Mr. Shelton will have no more trouble in explaining a good system to those that secretly know but won't confess,

I remain yours, F. G. DOLBY.

1. Likely that and the placing of the main by men who knew little about mainlaying.

[OFFICIAL REPORT—REVISED BY THE SECRETARY.—CONTINUED FROM PAGE 613.]

NINETEENTH ANNUAL MEETING, OHIO GAS LIGHT ASSOCIATION.

HELD IN THE GRAND HOTEL, CINCINNATI, O., MARCH 18, 19 AND 20, 1903.

FIRST DAY—AFTERNOON SESSION.

Discussing the Progress Department.

[For the text of the Progress Department, as submitted by Editor Butterworth, see *ante*, p. 605.]

The President—We have heard a contribution to gas literature which I think will always remain as standard for all of us to examine on any point of general information. The subjects have been covered so thoroughly that I do not see much chance for discussion. However, if anyone has any questions to ask Mr. Butterworth, as he is fresh in the details surrounding these figures, they will now be given an opportunity to ask them.

Mr. Stone—Regarding the first sentence on page 16, with reference to low pressure distribution, Mr. Butterworth says: "A large distribution system is now being planned for a western city contemplating 12 and 16-inch feeders and 2-inch wrought iron distributing mains; this arrangement having been determined upon as the most economical." I wonder if that "Two-inch wrought iron distributing main" was not too light; or whether there was a misprint. It seems to me rather small.

Mr. Butterworth—They are arranging to put in 2-inch wrought iron distributing mains.

Mr. Schwarm—To what city does Mr. Butterworth refer in that statement?

Mr. Butterworth—Denver, Col.

Mr. Schwarm—Are the 2-inch mains to be distributing service mains, or are they to act as boosters for the 12-inch system?

Mr. Butterworth—Distributing mains, to be fed by the other mains.

Mr. Schwarm—What pressure is to be carried in the 2-inch mains?

Mr. Butterworth—About normal pressure; whatever is considered to be practicable.

The President—It is not a high pressure system?

Mr. Butterworth—Not at all.

Mr. McIlhenny—What is the longest run of 2-inch, taking it on the average?

Mr. Butterworth—I think we can safely run a half mile.

Mr. Stone—Did I understand Mr. Butterworth to say that the 2-inch mains run for a half mile, and that they were only fed at one end?

Mr. Butterworth—I didn't say that they were only fed at one end. At each end of this half mile of 2-inch main there will be a feeder line.

The President—In other words, the feeder lines will be a half mile apart?

Mr. Buttterworth—Yes, sir.

Mr. Stone—That means you have practically 2,000 or 3,000 feet of 2-inch pipe to be fed from one end?

Mr. McIlhenny—I would like to ask for more information in reference to street mains. On page 12 Mr. Butterworth states that a safety or balanced governor is now being placed ahead of the usual automatic governor, for the purpose of delivering gas to the latter at a constant pressure. About how many such arrangements have been installed that Mr. Butterworth knows of?

Mr. Butterworth—I cannot state the number, but I think Mr. Hayward probably can furnish some information on that subject.

Mr. Hayward—I will be glad to reply. The question has come up several times, and I have been interested in it from the fact that a large number of holders constructed during the last 2 or 3 years have been of the 3-lift order. With 3-lift holders, of course, you know there is a difference of pressure that often runs up as high as 10, 12 to 14 inches. That is because of the different pressures; it depends upon which lift is cupped. The result is that the inlet pressure on the automatic governor varies, depending upon which lift is cupped, and to do away with that the balanced governor is set to the pressure of the lowest lift, or the lowest pressure, so that the other two beyond the cup will always give a uniform pressure. Another advantage, and that is the question of safety. I believe in Europe they call it the safety governor. In case of any accident to the automatic or the regulating governor, the pressure will never be more or greater than indicated by the safety governor. As to the question asked by Mr. McIlhenny, with reference to how many have been installed, I will say that every 3-lift holder that I know of that has gone up in this country during the last 2 or 3 years has always had a balanced governor ahead, and I do not know of a single case

where there is any exception to that rule. So the answer is that, out of probably 50 governors sold this last year, at least 75 per cent. have been sold in double governors, a balanced governor always ahead of the automatic. I trust I have made the thing perfectly clear to you.

Mr. W. F. Clausen, Portsmouth, O.—Under the heading "Station Meters," Mr. Butterworth says: "There seems to have been no progress made in the perfecting and developing of proportional meters." I understand that the Chicago plant has a proportional meter, and as I think there is a gentleman here from Chicago, I would like to have him explain it.

Mr. Osbourne—I do not like to elaborate on it very much. While we are using proportional meters at Chicago, I cannot say that I am very well acquainted with them. The first proportional meter used at the Twenty-second street station in Chicago did not work very successfully. The experiments were made in tandem. The variation ran from 25 to even 40 per cent. from the ordinary meter, so it was considered unworthy of being installed; but it was afterwards found that something was wrong with the shunt or diaphragm, or something of that kind, and the parties who installed the meter succeeded in inducing the Company to install them in Chicago, which is a plant I believe that they have some interest in. I am informed that since the first proportional meter was set at the Twenty-second street station some 3 or 4 others have been installed by the People's Company. I have also been informed from reliable sources that some 15 or 16 others have been ordered by the same Company, which I think speaks well for the proportional meter.

Mr. Hayward—On page 50 of the "Question Box" question number 38 is: "Do proportional meters measure a percentage sufficiently accurate as a basis to calculate entire manufacture where accounts are demanded showing losses by leakage and condensation?" That question is pretty fully answered in the 2 or 3 pages following, and will probably furnish the information desired.

Mr. Doherty—That will come in the Question Box proper, if you want to wait for it.

The President—Any further questions or remarks?

Mr. Perkins—I would like to move a hearty vote of thanks to the Editor, Mr. Irvin Butterworth, with the recommendation that he be continued in office. He seems to have covered the ground very thoroughly indeed, and I think his is one of the most valuable contributions to gas literature we have had for years.

Mr. McIlhenny—I take great pleasure in seconding the motion, as well as the recommendation.

Mr. Butterworth—Mr. President, if remarks are in order, I wish to say that I am not anxious for the job another year at all. I think you are fining a man for trying to do his best. (Laughter aad applause.)

[The motion was then unanimously adopted.]

THE QUESTION BOX.

The President—We are now up to the Question Box, under the editorship of Mr. Doherty. Has anybody any more lists to hand in of questions to be considered and discussed?

Mr. Doherty—As near as I can make out from the lists handed in, the question which received the most votes is found on page 139, and is numbered 413:

"Are 8-hour shifts desirable?"

I will first read the printed answers to this question as follows:

"No.—FREEPORT GAS LIGHT AND COKE CO."

"At a small works you cannot always afford to keep a general foreman. In this case the men want to be the best you can get, so that your machinery and works will be kept up and the works looked after so as to get the best results. Our experience has been that it is best to pay the men as a unit according to the whole amount of work done, and work 8-hour shifts, the men dividing up the work.—F. W. STONE."

"I think they are. A 12-hour shift is a very long one, and the whole tendency of the country appears to be toward shorter hours. A man does more work per hour in an 8-hour shift if he attends to his business than he will in a 12-hour shift.—C. O. G. MILLER."

Discussion.

The President—The question is open to oral discussion. I will call upon Mr. McIlhenny to open it.

Mr. McIlhenny—I do not know a great deal about it, although probably all of us have had some experience with the subject and realized that it is a problem we will have to consider and dispose of. One company I know had to come to it. The men stated they could get along with a fewer number, and while we could since that time have restored the former condition, we have not undertaken to do so. We are not prepared to say whether it is economical or not. It probably is not quite so economical as the previous plan, but we cannot help ourselves.

The President—Any further remarks?

Mr. Clausen—We have had some trouble on this line at Portsmouth, O. The men asked for an 8-hour shift and we so arranged it. I think the results were just as good, if not better, than when we we were working on the 12-hour shift. The men must rest upsome time, and our experience has been that we can get along about as well on the 8 as on the 12-hour system.

The President—At the same expense?

Mr. Clausen—Yes; for the same amount of money.

The President—We would like to hear from Mr. Miller on this subject.

Mr. Miller—Regarding this matter, there is no question in my mind bnt that you will be able to get along with an 8-hour shift. As to whether it will be as economical or not is quite a different matter. I do not think it would be as economical. It is mainly a matter of wages. If men working 8 hours only receive two-thirds as much pay as they receive when working 12 hours, of course, there would be no difference as to economy; but I doubt very much if we could lower the wages to that extent, for which reason we consider it best to work on the 12-hour shift.

The President—We will now pass to the next question.

Mr. Doherty—Before passing to the next question I simply desire to state that the tendency in all labor circles seems to be towards shorter hours, with the same pay or an increased pay upon a per diem basis, so I would advise every gas company to do what I have done with one with which I am connected; that is, to pay strictly on an hourly basis. Then you can make it more apparent to the workmen, when they ask for a diminution of hours from 12 to 8, that they are making a radical demand. Decreasing the hours from 12 to 8 at the same rate of pay is equivalent to increasing the pay 50 per cent. If you are paying on an hourly basis you can probably be in a better position to compromise than if paying on a daily basis.

The next question which seems to be the most popular one is:

No. 3.—"Assuming that some coal must be stored to insure a supply at the works, is it better to leave the same coal stored all the time for any emergency that might arise, and use fresh coal as far as possible; or it is better to use the oldest coal; and should the old coal be cleaned out once a year?"

"If coal must be stored to insure a supply at the works, I believe it far better to not retain it longer than one can possibly help, as I find it far more economical to use coal as near fresh as possible.—J. H. ENRIGHT."

"For 28 years I have tried leaving the same coal stored, and have used it up every year. The coal stored for several years yields much less than when used up each year. We also notice in using that coal which has been stored in the yards, and is shipped to the gas company when coal is scarce, the yield is less, and of course it weighs less and is more bulky to handle.—G. N. CLAPP."

"If we use the old coal first the new is ageing, so I cannot see that it makes any difference. It is a mere matter of convenience.—C. E. BURROWS."

"Depends entirely upon the condition of storage. Coal loses 18 per cent. of its value per year by standing. Consequently, the fresher the coal and the sooner carbonized the better will be the results.—V. L. ELBERT."

"I believe that it is better to use the oldest coal rather than fresh coal, because coal in storage suffers deterioration, and the danger arising from spontaneous combustion is avoided.—B. H. PETLEY."

"I believe it is better to have the coal storage bins so arranged that the coal can be used, observing the rule of constantly working out the oldest coal, so that if the stock of coal is sufficient to cover a six months' supply, the coal stock would never be over six months old. Occasions might arise when we would be warranted in using the freshest coal available, but for regular running I think the method indicated the best and most economical in the long run.—THOS. D. MILLER."

"From our experience we get just as good results from Youghiogheny coal one or two years old, but would advise using within three years.—FREEPORT GAS LIGHT AND COKE CO."

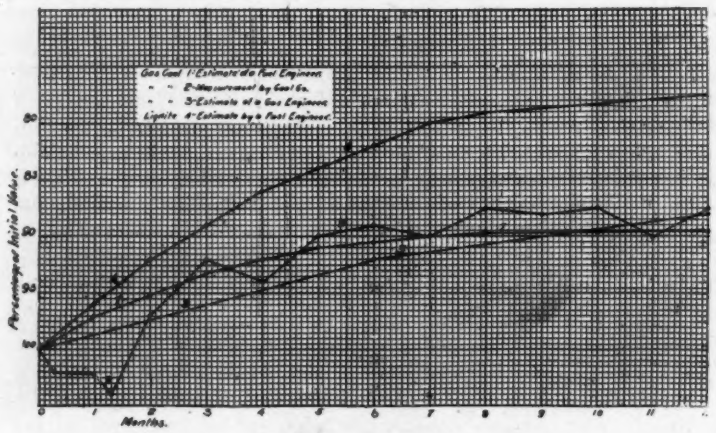
"Our experience with Westmoreland coal is that the shed should be cleaned out once a year, if possible.—HENRY B. LEACH."

"As deterioration in stored coal is a process of slow distillation, it would seem a reasonable deduction that the gas distilled from the outer

surface would leave a coating which would impede the deterioration from the interior, and that it would, therefore, be better to hold stock coal in store indefinitely.—ERNEST F. LLOYD."

"Old stock of coal should be cleaned out before using any new, providing conditions for storing will warrant.—GEO. WHYSALL."

"This question warrants extensive investigation. My belief is that coal deteriorates rapidly at first and then changes less and less. A time must come when the change becomes almost unnoticeable. If this belief is correct, why should we aim to use the stored coal periodically, when no appreciable change would occur were it left stored for another year. We have reason to believe that, in restocking with fresh coal, the depreciation will be far greater than would be the depreciation on the old coal if left stored for another year. Why pocket this loss every year? It seems to me the loss will be increased in almost the proportion of the number of times the stock coal is used. I think we should aim to always use the freshest coal first. I do not think this or the other answers to this question can be accepted as conclusive. I will endeavor to locate all of the available literature on this subject during the coming year, and also have tests made on certain coals. This subject warrants the further consideration of this Association at some future date. I append chart which tends to bear out my position, although I do not think it worthy of very great consideration.—EDITOR."


Gas Coal 1-Estimate of a Fuel Engineer.
" " 2-Measurement by Coal Co.
" " 3-Estimate of a Gas Engineer.
Lignite 4-Estimate by a Fuel Engineer.
Percentage of Initial Value.
Months.

Discussion.

Mr. Doherty—The chart shows 3 estimates. One purports to be the measurement of a coal company, but the conditions under which it was made are rather doubtful and it is so peculiar as to excite suspicion. According to this chart your coal for the first 40 days becomes better instead of worse, and then it depreciates during the next 50 days—it depreciates very rapidly and from then on it depreciates more slowly. So, of course, one safe rule would probably be to store that coal which will depreciate the least. Now, according to this chart—which is supposed to be the measurement of the coal company—unless you use your coal in the first 40 or 50 days it is not of much consequence when you use it, but always try to use your coal before it has been stored 40 or 50 days. The question is now ready for oral discussion, Mr. Chairman.

The President—Any discussion on this question?

Mr. Osbourne—If you use 8 per cent. as a multiple in 13 years it would run it into the ground, wouldn't it? I know of coal that has been in store for 13 years, and while it is pretty good coal yet, it is not as good as if used when it was fresh.

Mr. Miller—About 4 years ago we had occasion to commence using a stock of coal that had been stored under cover for 20 years previous to that time. It was Youghiougheny coal and the results attained from it were equivalent to any coal received the previous year. At the present time we are working similar to the way stated by Mr. Thomas D. Miller. He says: "I believe it is better to have coal storage bins so arranged that the coal can be used, observing the rule of constantly working out the oldest coal, so that if the stock of coal is sufficient to cover a 6 months' supply, the coal stock would never at any time be over 6 months old." While this is very good, it is not economical even to work in that manner, because we must use our coal as we receive it at the wharf landings. There are times that we receive no coal for 4, 5 or 6 months during the summer. During that time, if we hadn't coal stored in barges, we must use coal from the stock in the yards, but if we have a freshet and can get coal from Pittsburgh or the Kanawha mines, we commence using the freshly mined coal and from it we get a little better result than from the coal which has been stored for a year. This question I presume means without cover. Some of our coal is stored to the depth of 38 or 40 feet, and we find that the top 2 or 3 feet will depreciate probably to the extent of 5 or 6 per cent. the first 2 years, but the coal below that we can always get as good yield from as any coal obtained the previous year.

The President—Is the coal under cover that you speak of?

Mr. Miller—No; it is in the open.

Mr. Stone—I was in Buffalo some 4 or 5 years ago, and the manager of the gas company there was using up some coal that had been in the stock pile a number of years—I think possibly as many as 12 years—and his experience coincided with the gentleman who just spoke. The top 2 or 3 feet was depreciated, but below that it was all right. It was stored something like 20 feet high, but the inside of the pile was all right. He said he could not tell it was not just as good as the coal he got fresh from the mines. But outside where the coal was exposed to the weather it had depreciated about 5 or 10 per cent.

The President—If there is nothing further on this point we will continue.

Mr. Doherty—The next question in popularity is question

No. 13.—"Are purifying houses necessary?"

"Yes. (a), To protect the men when filling in winter; (b), to protect the oxide from the elements, when revivifying; (c), to protect the boxes in summer from extreme heat.—V. L. ELBERT."

"In a country of extremes of temperatures; yes. Depends on climate.—HENRY M. HUNT."

"Purifying houses are necessary in extremely cold climates because of the reduction in temperature of the gas in the purifying box, and the consequent reduction in the chemical action going on in the purifying material; chemical action occurring more readily in the presence of heat.—THOS. D. MILLER."

"Yes; in northern latitudes.—FREEPORT GAS, LIGHT AND COKE COMPANY."

"To answer this question it will be necessary first to ask some questions and answer those.

"1. Is purification a mechanical or chemical process?

"2. Does purification take place equally as satisfactorily under all temperatures?

"In answer to the first question, that it is a chemical process no one will dispute; and upon the second question really hinges the primary one. It is a well known law in chemistry that any process is a chemical one which does in itself evolve heat to a lower or higher degree. The revivification of oxide with its production of heat is a clear example of this law. I think it is the general practice when we want to revivify oxide, to first heap it up before spreading it out, because experience has taught us that revivification takes place more rapidly and efficiently when we assist the process by allowing this accumulation of heat. Is it not reasonable, therefore, to suppose that it is good practice to keep the oxide in the boxes at such a temperature as will assist the process of purification? There is no doubt that we can keep too high or too low a temperature which will retard or entirely prevent the process of purification. It is, therefore, necessary to maintain that degree of temperature which is the most conducive to purification. Can this be done without the assistance of housing the purifying boxes in every locality? I believe not Consequently, I answer, purifying houses are necessary. There are, however, localities where only shelter is needed to protect from rain and sun.—JOHN GIMPER."

"Purifying houses are unnecessary and their non-use permits the investment to be greatly reduced, and the present relation between fixed and operating costs is such that it behooves every gas engineer to study means for reducing his purifying equipment investment, as this offers greater opportunity for saving than can any change in operating methods, assuming that cost of purification is no higher than pertains in well regulated plants.—EDITOR."

"Purifying houses may not be necessary, but they are extremely desirable, particularly in regions where the temperature falls to freezing or below, or where it is liable to rain or snow for a few days when it is necessary to change them.—O. O. THWING."

"Purifying houses are not necessary if a modern type of box is used. We have installed, at Madison, Wis., a Doherty-Butterworth purifying box which is situated out of doors. It is lagged with double sheeting of ¾-inch, tongued and grooved boards, between which is a layer of building paper. The top is sheeted in a similar manner, and also covered with galvanized iron. Openings provided with hood coverings are arranged in the top to permit of access to the filling doors, and 4 counter weighted doors are provided on each side of the sheeting, near the ground, for ready access underneath the box.

"The entire cost of covering, including 2 coats of paint, was a little

under $300, which is many times less than the cost of the most cheaply constructed purifying house.

"A steam coil was provided under the box, and notwithstanding there was considerable cold weather during the past winter—one spell lasting 4 days, when the thermometer dropped to 15° below zero—we did not find it necessary to use any steam, and during this period the temperature of the gas at the outlet of the box ranged from 50° and 60°; in fact, owing to the chemical actions which take place in the box, the gas comes out of the box at a temperature at least equal to the temperature at the inlet, and usually somewhat higher.

"We have also two old-style boxes situated in a purifying house, and have found it necessary to keep steam on the purifying house whenever the thermometer dropped below 40°.

"To sum up in a few words: It is possible with the D-B box, arranged as our Madison box is arranged, and situated out of doors, to work without the use of any external heat whatever. This is impossible where ordinary boxes are put in an ordinary purifying house, as the radiation of the building is so much greater, owing to the fact that the area is so much greater. It is also necessary to thoroughly ventilate a purifying house, to guard against an explosive mixture of gas and air, and for this reason heating is absolutely necessary.

"The only possible objection that could be advanced against placing a purifying box out of doors is the difficulty that one might expect in maintaining the temperature, but the temperature can be maintained with this kind of a box more readily, even though situated out of doors. than on an ordinary box in a purifying house, and no bad effects can follow.

"It is, of course, necessary to have some sort of a shed or building for reviving spent oxide, but this building can be of very cheap construction, and it is hardly necessary to make it even fireproof, as the damage would be slight should it burn, and the loss would be trifling.—M. E. MALONE."

Discussion.

The President—Has anyone any ideas to advance on this subject? I will call on Mr. Thwing, of St. Louis

Mr. Thwing—I do not know that I have anything further to say other than I said in the discussion of the question as already read by Mr. Doherty. I think purifying houses could be dispensed with if you have capacity sufficient to allow you to get along some time without changing the boxes.

Mr. Schwarm—May we ask for a little more explicit information as to the construction of that Doherty-Butterworth purifying box? I would like to have some clearer explanation of it,

The President—That box was described in detail three or four years ago, and will be found in the printed proceedings of the Ohio Association.

Mr. Doherty—I think it was in 1899.

Mr. Butterworth—No; it will be found in the proceedings of the annual meeting for 1898.

The President—By referring then to the proceedings of that year you will find an answer to your question. If you haven't that number let me know and I will lend you my copy.

Mr. Hayward—I feel that as this is quite an important subject it should be discussed somewhat fully. I think that Mr. Gimper strikes the nail on the head. If I remember aright Mr. Gimper is located at Galveston?

Mr. Butterworth—Yes.

Mr. Hayward—In rather a warm country, and he ought to be able to talk entertainingly on the subject of whether or not you need a purifying house. He says that this matter of purification is a chemical process, and if a chemical process, then more or less heat is generated. In my own experience, which is largely theoretical—because I am not engaged in the practical business of purifying gas, but in the purifying material business—I find often where complaints are made that the oxide will not work properly; it is in the winter time, when the temperature has run down so low in the purifying house that the chemical action is not taking place. When the the temperature runs down below 40° in the purifying house, then there is that much chemical action taking place. Even at Louisville, some years ago, this same matter came up. Now, Louisville is not a very cold locality, yet in a purifying house there they had all sorts of trouble, and not until they brought the temperature of the purifying house up to about the same temperature as the gas when it enters the box were they able to get proper results from it. Mr. Malone in speaking of it says he has given protection to his house by sheathing both on the sides, top and bottom, and he has, to a certain extent, protected it from low temperature. He has also taken the precaution of putting in steam pipes, so that he is able to protect it somewhat. It is so constructed that he has not as much of an area to heat up as he would in the ordinary purifying house. But it seems to me it is very essential, especially in the old type of box, where the oxide is not so deep and where there is a smaller quantity used, this matter of temperature is a very essential element in purification. I wish this matter would be taken up more fully and gone into more thoroughly. I think it is a subject over which we should not jump at conclusions too suddenly in regard to the matter of temperature, because the latter is a very essential element in the process of purification.

Mr. Lea was then called on, and said: The English practice, where the climate is very mild in the winter, is to build a box, ordinarily 5 or 6 feet deep, out in the open, on a foundation that is below the surface of the ground, so that when the ground is filled back you get an operating floor just a reasonable distance below the top of the seals, which would correspond to the wooden operating floor of the ordinary purifying house. Then they put a wooden shed over the top of that, so that in changing the boxes they are protected from the weather. It very seldom snows in London, and the South Metropolitan Gas Company, which make the cheapest gas, have all of their boxes put in in that way. Other companies have adopted the same plan. By having them underground, even if they had a little frost, the lower part of the box would still be comparatively warm.

Mr. Steenbergen—I would like to ask if any gentleman has had any experience in the use of concrete boxes? I have one in use, 8 by 8 by 4 feet deep, which I have found to be perfectly satisfactory, and haven't had any inconvenience from the cold weather; although it is outdoors and unprotected. I have experienced no trouble with it, even when the thermometer was down to zero.

Mr. Miller—Do you consider it is unnecessary to have purifying houses, whatever may be the temperature of the climate?

Mr. Doherty—Yes, sir.

Mr. Miller—In our experience we consider it good practice to provide the revivifying room with lattice windows, having them open in the summer and in the winter time putting in glazed sash to keep the room warm.

Mr. Doherty—I had to answer that question *sotto voce* so that nobody else could hear it. There is no object in building a purifying house if the purifying house won't maintain the temperature as well or better than by putting the boxes outdoors. I do not see why you should adopt that form of construction which is most expensive and which gives you the least protection against the elements. We took the precautionary measure of putting steam pipes under these boxes, and found them entirely unnecessary, because we reduced the ratiating surface or area for the radiation of heat to such a small amount that the heat generated in the boxes is more than enough to compensate for the radiation. In Madison, Wis., the thermometer goes down 35° below zero. We had a chance to measure the work of these boxes alongside of boxes housed in the usual manner, and found the boxes inside of the houses had to have steam heat whenever the temperature fell below 40°, but we found the other boxes which were situated outdoors, and which were protected simply by sheeting, did not have to have steam, even if the thermometer fell to 15° below zero. That is very easily understood, I think. You do not have to ventilate the cover of that box. Nothing can get into the cover of the box to cause an explosion; there is no room for a violent explosion except below the box. Take a great many of the purifying houses throughout the country, as Mr. Hayward pointed out; they do not secure good results, because they are not able to maintain the temperature ordinarily required for purification. In one of our plants we have just such a condition. We have a big purifying house. It is necessary to ventilate that house thoroughly, and practically all the exhaust steam of the works will not keep up the temperature in that purifying house to the point it should be, and the gas cools in proportion to the radiating surface of this box exposed to the atmosphere of that room. I cannot see any particular object in a purifying house except to protect the men from the elements in filling and emptying the boxes and to maintain the temperature of the boxes. The temperature proposition is settled. There is no other form of construction that will permit the purification process without the use of some external heat. Now, the matter of filling and emptying the boxes. We do not figure we will have to fill or empty a box more than once a year. We can do that in the summer time, and even in the winter time if it became necessary to do so, it would be a very short job to fill and empty it. We use a pneumatic conveyor or an air blast to fill the boxes, and the only place the men would have to work would be directly under the box, where they are protected from the weather.

Mr. Hayward—When the boxes are changed?

Mr. Doherty—Yes.

Mr. Steenbergen—What is the depth of the boxes?

Mr. Doherty—It is a box where the oxide lays in vertical not in horizontal beds. The total depth of the box I think is 15 or 16 feet, and it is 6 feet 6 inches above the ground.

Mr. Butterworth—It is 13½ feet deep.

Mr. Doherty—Yes, 13½ feet deep. Take what is called the Chollar box and that is just as applicable to outdoor use as this box. Perhaps not as applicable, but it is applicable to outdoor use.

Mr. Hayward—That is a circular box; isn't it?

Mr. Doherty—Yes.

Mr. Hayward—Then it is positively settled that, as a question of temperature, it is not safe to put a purifying box outdoors without any protection, isn't it?

Mr. Doherty—Yes.

Mr. Hayward—I wanted to have it sufficiently clear, so that we will all understand it, that you could not put a box outside and not give it any protection.

Mr. Doherty—You have to maintain a certain temperature in the box for the purifying process, but in the way we constructed this one at Madison, Wis., we can more easily maintain that desired temperature than we can by the old form of construction.

The President—Any further discussion on this question?

Mr. Miller—Won't you have to have a receptacle for the reception of the foul material?

Mr. Doherty—No; you would simply require a house to put it into and to revivify it.

Mr. Miller—I understood you to say you would not have to have a house?

Mr. Doherty—I said not have a purifying house. I did not say you would not have to have a house to revivify your oxide, although that would not be necessary if you had capacity enough in your boxes, because you could always revivify in the summer time, but the cost of constructing a revivifying shed is insignificant as compared with the cost of constructing a purifying house.

The President—If there are no further questions, we will pass to the next.

Mr. Doherty—The next question, from the standpoint of popularity, seems to be Question No. 40, on page 52. Before I read it I would like to say there seems to be more interest in problems relating to the purification of gas than anything else. I have received more questions directed towards the purification of gas than any other one subject. To my mind, I think it is the least important of all the subjects that gas men have to contend with; that is, if they are problems from the standpoint of gas economics. The question is:

No. 40.—"What is the present practice in building new coal gas purifying houses, in regard to the number of boxes—*i. e.*, where it is desired to run without adding air, would it not be better to have 3 instead of 2 deep boxes, using one as a reserve to turn in when changing the third?"

"We think 3 boxes is far preferable.—C. E. Burrows."

"Yes; 3, and better with 4, where no air is used.—V. L. Elbert."

"The best known practice is to build 2 boxes. If the boxes are large enough one will do all the work; the other is simply in reserve.—Thos. D. Miller."

"Yes; better have 3.—Freeport Gas Light and Coke Co."

"Reference: American Gas Light Journal, Vol. 77, p. 586.—A. E. Forstall."

"I have used the 2-box system of purification for the past two years, and my experience with it is not very satisfactory. It is difficult to prevent the foul gas from finding some way through the oxide and showing at the test-cock before the oxide is one-third used. When this happens with 1 box on, you are likely to have some dirty gas pass to the consumers' burners. If I had a third box to use when taking off the dirty one, I would be saved any trouble from complaints of sulphur in the gas, which has happened twice in the two years. While I may have decreased the cost of purifying by over ½ per cent. per 1,000, by changing from 3 boxes (shallow ones) to 2 deep ones, yet purified 2½ times the quantity of gas per bushel with the 3 boxes than I have with the 2 boxes; and in the first case I never had a complaint of dirty gas, while I have in the latter.—Henry S. Whipple."

"There should be a balancing limit in purifying plant between capital charge and operating expense. The small number of boxes having naturally the least capital charge, implies also the largest cost for operating, and *vice versa*. Oxide which shows foul will generally have a considerable remaining capacity for absorbing sulphur. In a 3-box system, if the first box is not changed until the second begins to show foul, it will do a great deal of efficient work. The boxes should be as deep as a single layer of oxide will satisfactorily work, and this would seem to be materially in excess of current practice. In any event, the argument for a third box I consider to be very strong.—E. F. Lloyd."

The President—If there is nothing further to be said on this interesting subject we will pass to the next.

Mr. Doherty—The next question is:

No. 43.—"How does the cost of purification in the West compare with the cost 10 years ago?"

"It is much cheaper.—E. M. Osbourn."

"Ten years ago we were using the same material we now use; viz., homemade sponge, and the cost was and now is so small as to be almost a negligible quantity.—C. E. Burrows."

"Cost of purification of gas at Dallas, Tex., is about 1-10 of what it was 10 years ago.—Thos. D. Miller."

"Owing to improved facilities, less than half.—Freeport Gas Light and Coke Company."

"The cost has certainly diminished considerably. The knowledge of the effect of velocity on purifying results has done more to cheapen the cost than has any other factor. Good scrubbing has also cheapened the cost. A good engineer should always consider both the fixed and operating costs of everything, aiming to get the lowest total cost. Money is often invested in purifying equipment (ground space, houses, boxes, valves, conveyors, etc.), for the sake of reducing operating expenses, which is entirely unwarranted. The investment for purifying equipment may be assumed at from $15 to $75 per 1,000 cubic feet capacity per day. A fair average investment charge will be, say, $30. Operating expenses where oxide is used will vary from, say, .1 to 1 cent per 1,000, and probably .25 can be taken as an average in well regulated plants. We will assume the average gas company must sell its bonds on a 5½ per cent. interest basis, and our depreciation is 2½ per cent. Then, assuming an investment of $30 per 1,000 cubic feet, our fixed charges become 5½ + 2½ = 8 per cent. of $30 = $2.40 for 1,000 cubic feet per day, or 365,000 cubic feet per year—a cost of $2.40 ÷ 365,000 = .657 cents per 1,000. It is apparent that this would be the minimum cost for fixed charges, as we have figured on working these boxes at their maximum capacity every day in the year. This would mean that our output for every day in the year would be equal to our maximum day's output. We know that this is not the case, and as our fixed charges *are* fixed our cost per 1,000 will increase if our output diminishes. The yearly load factor on basis of maximum daily demand would be from 55 to 70 per cent. By this I mean that our yearly output would only be equivalent to approximately 200 days X the maximum day's demand, or approximately 255 days X maximum demand. If we assume a load factor of 65 per cent. (approximately 237 days at maximum day's demand) our cost becomes 65 per cent. of 365,000 = 237,000 cubic feet and $2.40 ÷ 237 = 1.01 cents per 1,000 cubic feet purified. If our operating cost is .25 our total cost becomes .25 + 1.01 = 1.26 cents per 1,000, our operating cost being but 18.25 per cent. of our total cost. From this line of reasoning I conclude: (1st) That operating costs of purification are already so low as to be of minor importance; (2nd) that our most rigid attention should be directed towards reducing our investment for a given capacity. As an example, we can afford to increase our operating expenses 100 per cent. if that will permit us to reduce our investment expenses by 25 per cent. This would result in about the same total cost for purification.—Editor."

The President—Any comments to be made on this question? If not we will take up the next.

Mr. Doherty—The next question is:

No. 29. "How can exhaust steam be most advantageously used?"

"For heating and condensation, being used again in the boilers.—V. L. Elbert."

"For heating buildings for gasholders. In large works where water can be obtained easily, engines running condensing through the warm months and exhausting into the heating system during the winter, will show economical working.—F. M. Travis."

"Exhaust through feed water heater, then to water in holder tank to prevent freezing.—C. L. Steenbergen."

"In a small works, to heat the exhauster, purifier and meter rooms and the water in the holder pits.—F. W. Stone."

"In a New England gas and electric plant we used the exhaust steam from a 35-horse power Atlas engine, driving the blast fan for the water gas machine, to heat the plants during the daytime in winter.

We used the exhaust steam for heating the oil and also for heating the feed water for the boiler.—FORT MADISON GAS LIGHT COMPANY."

"The contributors to this question have not called attention to one way of advantageously using exhaust steam. It can often be more profitably used as a substitute for water in your bench furnaces than in any other way. As a rule gas engineers are brutally uneconomical in their use of steam in spite of the fact that they can afford to use higher class apparatus than most other industrial plants. Most of their steam apparatus runs 24 hours per day, and interest and depreciation (figured at 5 + 5 = 10 per cent.) on an extra investment of $20 per horse power for the purpose of additional economy would, therefore, amount to 10 per cent. of $20, or $2 per year, which, divided by 24 × 365 = 8,760, is equivalent to only $.000228 per horse power hour. These fixed charges would amount to 24-10 of this for a plant operated only 10 hours per day, which would be $.000548. Many electric plants average less than the equivalent of four hours per day at full load, so these charges on a 4-hour basis would become $\frac{24 \times .000228 =}{4}$ $.001368 per horse power hour. The total amount of steam used in a gas works is small and, therefore, the waste is small in the aggregate although enormous in percentage. Conduction of steam about a gas plant is a nuisance outside of the enormous waste. I believe there are greater opportunities for steam economies that in any other branch of the gas business. One gas works now being erected will almost entirely supersede the use of steam for power purposes by the use of electric power generated by gas engines. The question of steam economies should be taken up at some future time by this Association.—EDITOR."

"We use the exhaust steam from our coal gas exhauster under the grate bars in our ¾-depth generator furnaces—W. B. TUTTLE."

The President—Anyone wish to make any remarks on this question?

Mr. Doherty—The next question in popularity is:

No. 39.—"Is the manufacture of coke oven gas now on a satisfactory working basis?"

"I am totally unacquainted with the present status of the coke oven gas industry. I was informed very recently, however, by a gentleman connected with the foundry business that he had been obliged to discontinue the use of coke from one of these concerns and go back to the oven coke. He gave two reasons: First, that the coke was too soft to hold up the iron, thereby preventing a proper working of the cupolas and a uniform melting of the iron; second, that the amount of sulphur in the coke did not run at all uniform and frequently exceeded the limit that good foundry practice fixes.—O. O. THWING."

"Yes."—GEORGE WHYSALL."

Mr. Doherty—Mr. Andrews' answer to this question miscarried by mail, so that it could not be embodied in the written report, therefore I will ask him to give it orally.

The President—Pardon me for addressing you from the Chair. The opinion expressed by Mr. Thwing is probably due to some poor quality of coke received, owing to troubles which all coke ovens have had this winter, especially by-product coke ovens, but as a general proposition there is no trouble with coke for foundry use. It is being used very largely and more largely every day, as the data which was read to you a short time ago will illustrate. The use of by-product coke ovens is extending wherever the conditions are such that coke can be satisfactorily and profitably sold and a supply of coal can be assured at all times. The balance can be used if the gas can be taken care of, and the town is large enough for it. The fact that so many plants are going up is of itself evidence of this fact.

Mr. Thwing—In my statement, Mr. President, I believe I did not express any opinion at all, but simply reported the facts as they were reported to me.

The President—Any further remarks?

Mr. Doherty—I can hardly conceive a question like that being passed over without any more comment than this question has received. I thought it was the most important question in the whole list. The next question is:

No. 58.—"Has anybody had any experience in extracting sulphur from gas made from coal containing 6 per cent. of sulphur, using 3 or more washers and iron oxide to perform the work?"

"I know of no one who has had experience in extracting sulphur from gas made from coal containing 6 per cent. of that substance, using 3 or more washers and iron oxide. The only way I have myself been able to handle gas from such has been to use lime and change purifiers, not by chemical test, but by meter indications.—B. E. CHOLLAR."

"It cannot be done; I have tried it.—K. M. MITCHELL."

Discussion.

Mr. Bredel—What is meant by "3 washers" is what I want to know first?

Mr. Doherty—I don't know.

Mr. Bredel—Who asked the question?

Mr. Doherty—Mr. Bertrand, of Peoria, Ills.

Mr. Bredel—I had some experience with native Illinois coal at Aurora. I used 3 washers, actual washers (nominal), but which are practically 15 washers, and we found on an apparatus of a nominal capacity of 250,000 cubic feet that the apparatus would only handle 185,000 cubic feet satisfactorily. That coal probably contained 5 per cent. or more of sulphur.

Mr. Doherty—How did you take care of your CS_2?

Mr. Bredel—It seemed to wash it out. What sulphur compounds are formed there we do not know, and I do not think anybody else knows; but the fact of the matter was that the gas, after passing the washers and the oxide purifiers, contained only 22 to 23 grains of sulphur.

Mr. Doherty—You had a temperature in one of your washers above 150°?

Mr. Bredel—No; the first washer was about 100°. There might have been an increase of the temperature there by friction. Of course, we cannot tell that, but the fact of the matter is that the gas before leaving the washer was hotter than when it entered the washer.

Mr. Doherty—How much; about 10°?"

Mr. Bredel—No; not as much as that. Probably 5° or 6°.

Mr. Doherty—I would like to ask Mr. Bredel if a certain portion of his CS_2 was not removed in the fouled iron oxide boxes.

Mr. Bredel—I do not think so, for the reason that, in making some very extensive tests in Erie, Pennsylvania, on the subject of sulphur, the results obtained by using the best Pennsylvania coal brought the total amount of sulphur in the gas before entering the purifier down to less than 8 grains, which showed that quite a little of the bi-sulphide of carbon was removed. I do not recall exactly what it was, but that is as I remember it; there were practically 15 washes and not 3 washes.

Mr. Doherty—If we can get Mr. Bredel to tell us about the methods used in Aurora, Illinois, and Erie, Pennsylvania, I cannot imagine a more desirable contribution to our proceedings. I know he is a master of this situation if anybody is.

The President—We would be very glad to have Mr. Bredel elaborate what has already been said, so that we can form an idea of the purifying products to use in these places.

Mr. Bredel—The gas was passed, first, through an air condenser, and the outlet temperature was kept as near as possible between 95° and 105°; then it entered the first washer, consisting of 5 compartments, practically 5 washes; then the second washer, consisting also of 5 compartments, or 5 more washes. The gas passed through a water cooler and at last through another washer to take out the ammonia. The liquor from the last washer, in fact from all the washers, flows into a vessel which separates the ammoniacal liquor from the tar and the light oils mechanically taken along. Then the liquor is pumped over into the lower part of the last washer, and a great quantity, probably 10 to 12 gallons per 1,000 feet of gas made, is pumped over in the second and first washers. The one that took out the most sulphur compounds—the sulphur compounds were taken out—was the first washer, while the second washer took out the most carbonic acid, and, paradoxically as it may seem, the first washer took out quite a lot of ammonia, while the second washer did not, and the last washer finished it. That is the process.

The President—We are very much obliged to Mr. Bredel for going into this detail in regard to it. If there are no more comments on this question we will pass to the next.

Mr. Doherty—I would like to speak just one more word on this subject. I suppose the ammoniacal liquor in the presence of the immense amount of CS, would form bi-carbonate of ammonia rather than ammonia and sulphur compounds, and you have to get it to about 140° apparently to decompose your bi-carbonate of ammonia, and I thought the ammonia had a greater affinity for carbonic acid than sulphur. The results of some work I have done would seem to bear that out.

Mr. Bredel—I do not understand exactly about that. The thing I know is that the first washer took more sulphur, and the second washer more carbonic acid.

Mr. Doherty—I assume you were working on the first scrubber above the decomposition point of bi-carbonate of ammonia.

Mr. Bredel—If I could get inside of the washer I could find out very quickly. (Laughter.)

Mr. Harrop—I should like to ask Mr. Bredel what test he used for arriving at the amount of carbonic acid and sulphur compounds?

Mr. Bredel—In the combustion test for sulphur compounds and for

the carbonic acid we used, first, a small purifier and then determined the carbonic acid in the usual way by potassium hydrate.

Mr. Doherty—Did I understand you to say, Mr. Bredel, that you first took out the carbonic acid gas before you washed the gas; you first remove the carbonic acid gas by purification?

Mr. Bredel—No; that referred to the test for carbonic acid.

Mr. Doherty—The next question is:

No. 11.—"What substitutes can be advantageously used for shavings or sawdust in purifying material?"

"How would spent tan bark do? There may be an acid in this that would hurt the chemical action of the gas. Personally, I do not know. Or, how would a percentage of small, bright gravel or stones, say ¼-inch in diameter, do? With the use of moisture in the box, they would, I believe, arrest portions of the cyanides and at the same time separate the iron. The weight, however, of such material would be an objection.—V. L. ELBERT."

"If I could not get shavings or sawdust I would try hay or straw, cut up as a farmer cuts it for feeding.—C. E. BURROWS."

"Use lime.—C. J. FOX."

"I do not know of any substitute, considering cost and facility of obtaining, that could be advantageously used for this purpose. I have tried but one substitute which was very fine screened coke, about the size of a pea. This worked fairly well for a few months and then "went to the bad," with wonderful and annoying suddenness. A large part of the oxide had undoubtedly entered the pores of the coke and the gas could not come in contact with it. This experience has convinced me that a proper carrier of the oxide must not only be able to form a porous mass, but must be permeable to the gas in itself, the same as shavings or planer chips are.—O. O. THWING."

"Ground cork makes an excellent substitute for shavings or sawdust in the preparation of purifying material, and is superior in many respects to either. It is made from waste cork, and can be procured from any of the cork factories. It should be ground to about the size of a grain of corn to obtain the best results. Cork does not become saturated or soggy. Cork does not cake in the box. Cork does not become pulverized like sawdust or shavings. Purifying material made from ground cork, owing to its spongy nature, does not become as compressed as other materials. Purifying material made from ground cork only throws one-third the back pressure of other materials ordinarily used. Fifty per cent. more oxide can be mixed with ground cork than with a given volume of the ordinary sawdust and shavings mixture, hence, you increase the capacity of your box one-half, or purify 50 per cent. more gas with a given volume of the cork material. The initial cost of the cork is greater than that of the sawdust or shavings, but this is more than offset by its other merits. Ground corn cobs, it is thought, will also make a good substitute for use in purifying material. Experiments that are being made with ground corn cobs would indicate that they possess many, if not all of the merits of ground cork. The ground corn cobs cost about 50 per cent. less than the ground cork, which is an important item. The following tabulation gives the weight of 1 bushel (2,150 cubic inches) of different purifying materials:

Pine shavings	5.25	pounds.
Ground cork	6.00	"
Pine sawdust	12.75	"
Ground corn cobs	15.00	"
Iron oxide	112.00	"

M. E. MALONE."

"Ground corn cobs or chopped corn stalks.—GEO. WHYSALL."

Discussion.

Mr. Doherty—I might add in connection with this matter that the first I heard of this question arose in a certain gas plant where they had trouble getting suitable sawdust or shavings. As the boxes were small the purifying material had to be handled frequently. The result was that it would soon work up into a fine powder, as you all know shavings will do if they are handled frequently. To overcome this difficulty I used cross cut sawdust in preference to the shavings, but that soon became waterlogged, and I turned to Mr. Malone and asked him what substitute we could use. He said cork. I said, "It is too expensive." He said, "Ground corn cobs." I said, "Now I believe you have hit it." We inquired into the cost of cork and found while it cost a great deal per ton, it did not cost a great deal per bushel, and it maintained its elasticity in the purifying box. I do not know how long he has had it in use, but for several months, and we cannot notice any depreciation in it. I do not know how far the corn cob experiment has progressed, but we are going to give it a whirl to see if it is not a desirable substitute for shavings and sawdust. This question is now open for oral discussion.

The President—We would like to hear from Mr. Miller on this subject, if he has anything to say.

Mr. Miller—I do not know of any substitute for shavings.

Mr. Hayward was then called on by the chairman and said he did not know of any substitute.

Mr. Doherty—I think the members here must have supposed that we were asking them to select the most unpopular instead of the most popular ones. The next question according to the list I have before me is:

No. 424.—"What is the usual practice of gas companies when notified by the gasfitters' union that 8 hours will constitute a day's work?"

"Gracefully submit.—GEO. KIRK."

"We have just been notified that we must recognize, and our men join the union, or the use of gas will be tabooed by members thereof; no attention has been paid to the threat, and none will be at present.—HENRY B. LEACH."

Discussion.

The President—I believe if Mr. Whysall were here he could tell us something about it. I understand from the papers that the mayor and other officers in his city turned off the gas at midnight a few nights ago on account of its being boycotted by the labor union. Any remarks by anyone here who has had any experience with labor unions on their lines or at their works? No doubt someone has had some experience on this subject? Mr. Perkins, have you had any experience on this subject?

Mr. Perkins—We have not. We have a good feeling of fellowship between the labor unions and ourselves.

The President—Anything else?

Mr. Doherty—That is another unpopular question apparently, Mr. President.

Mr. McIlhenny—Cannot the President give us a little information regarding labor unions and boycotts?

The President—I do not know of anything particular within my experience that would be of benefit to you. We have never had any special trouble with labor unions, for the reason that we have always kept our men on higher pay than anyone else would pay, and as a consequence they would rather stay with us than join the labor union and receive less pay. We have found it more profitable to pay a little more than anybody else and get a little more work out of the men than to establish the labor union standard of wages and put up with the other troubles which follow it.

Mr. Doherty—The next question is:

No. 15.—"How large must a gas works be to warrant the adoption of charging and drawing machinery?"

"Any retort house whose eventual capacity will reach 500,000 cubic feet per 24 hours can well afford to install power charging and drawing machinery, and on this basis the gas company can afford to put the machinery in when its maximum make would run to one-half this quantity.—H. A. CARPENTER."

"I believe that, entirely aside from the labor question, power charging and discharging machinery can be used in any single stack retort house with a maximum output requiring 6 benches of sixes. This is assuming the use of the West combined type of power charger and discharger, which has a capacity of about 16 benches of nines and requires but one man per shift for its operation, and on the assumption that one of these machines, with its necessary compressor equipment, overhead hopper and coal elevator, could be installed at the particular point in question for $20,000, allowing 10 per cent. for interest and depreciation other than that taken care of in the ordinary repairs, wages of the two men to operate (assuming that the compressor would be taken care of by the boiler man who would be on the plant anyhow), and that the 6-bench plant would be operated at a capacity of 200 maximum days per year, or say, 72,000,000 per annum, with one extra man on the floor for each shift to care for pipes, etc., and the same allowance of men otherwise as for hand labor, the machines would work out to about 8.5 cents to 9 cents per 1,000 for retort house labor. Now, I believe that there are more plants of this size operating with all hand labor in which the retort house labor runs over 10 cents than under 10 cents, and yet I also believe that they can be operated on 9 cents, and, therefore, state it as my opinion that the smallest number of benches which can be operated with power machinery is 6 benches of sixes. On anything above that the power machinery will show a saving over hand labor. There are, however, made in England several types of manual charging and dis-

charging machinery which may be installed at a very much smaller capital and do away with from 30 to 50 per cent. of the men required in a small retort house. These machines can be used to advantage and at some saving in cost on any retort house employing over 3 benches, and for houses which will probably never exceed the equivalent of 10 benches of sixes, they are probably better adapted than the power of machinery. Either type of machine has, besides those enumerated, the very decided advantage of being able to charge the retorts fully up to their capacity, and to draw them without excessive labor on the part of the attendants, thus increasing the output per retort without increasing any of the other items commensurately.—R. B. BROWN."

"The writer has had no experience in the working of stoking machines, but believes that recent inventions in this line, and the condition of the labor question, must attract the attention of the management of medium-sized gas works. Very recently a combined charging and drawing machine has been put in operation in England which promises to fill the wants of medium-sized gas works of a capacity of 150 million to 200 million cubic feet per annum. The machine is operated by one man, who draws and charges the retorts, one man opens and closes the lids. The cost of operating, including furnace men bringing in coal and taking out coke, is about 30 cents per ton of coal carbonized. The cost of machine is about $9,000. Cost of bins, coal breakers and conveyors will be about $4,000, making a total cost of $13,000 per complete installation for 12 benches of 6 retorts (capacity of machine is estimated at 20 benches). The saving in labor (with machine over hand labor) would be 50 cents per ton of coal. In a works carbonizing 21,900 tons of coal per annum, using a stoker and drawing machine, a saving of 50 cents

Per ton	$10,950
Depreciation 8 per cent.—$10,960	1,040
Interest at 5 per cent	650
Saving machine over hand labor	$9,260

"From the above figures it is apparent we should be looking into the matter of stoking machinery. Our authority who is operating medium-sized gas works said: 'It cost very little more in summer time working 8 benches than when operating 12 benches.—K. M. MITCHELL."

"The plant must have a capacity of at least 1 million cubic feet of gas per diem.—GEO. WHYSALL."

Discussion.

The President—Mr. Thwing, may we hear from you on this subject?

Mr. Thwing—I believe I have nothing to add on that question aside from the discussion read by Mr. Doherty.

The President—I will call on Mr. Miller.

Mr. Miller—I would say 40 retorts, 5 benches of eights and 7 benches of sixes.

Mr. Doherty—Perhaps it might be well to read at this time in connection with question No. 15 question No. 16, and the two can then be discussed at the same time. Question 16 is:

No. 16.—"What saving can be made by machine stoking and drawing?"

"Question No. 16 can be no better answered than by referring the Association to pages No. 1607 to 1610 of the *Journal of Gas Lighting*, December 16th, 1902, which afford some very conservative results carried out to tons per man. These figures are given on a minimum number of 10 benches making about 8,000 cubic feet of gas per mouthpiece per 24 hours. The possible saving can readily be derived from comparison of these figures with results that any of the members are obtaining.—H. A. CARPENTER."

"The cost of all labor in a retort house figures out about as follows: Slopers, 2½ to 4 cents per 1,000; horizontals with charging and drawing machines, 3¾ to 4½ cents per 1,000; discharging machines only, 6 to 7 cents per 1,000; manual labor 9 to 10 cents per 1,000.—GEO. G. RAMSDELL."

Discussion.

Mr. Miller being called upon by the Chair, said: "It seems to me the manner of stating the cost, as it is stated in the written responses to these inquiries, is very indefinite because some plants pay different prices from others for labor. One plant may be paying $2.50 a day for doing the same work, and another plant paying $2 a day, so that of course the comparative cost would not be the same. It seems to me, to compare machine stoking with hand work, we should take the number of tons of coal carbonized per man in figuring the cost of labor. If the cost would be about 10 cents per 1,000 and wages $2 per day each man would be carbonizing 2 tons of coal. Our experience with stoking machines is that we can carbonize on an average about 6½ tons per day per man throughout the year. That is, taking the coal in the retort house bins and then to do the remainder of the labor and place the coke in the coke bins ready to be delivered to the wagons for market.

Mr. Carpenter being called on by the Chair, said: I do not know that I have anything to say, Mr. President, unless there is some question I could answer.

Mr. Bredel being called on by the President, said: I have not had very much to say about it, but if you want to know where Mr. Ramsdell got his figures I wish to state that I made them up myself, years ago.

Mr. Doherty—You have changed your mind since, haven't you?

Mr. Bredel—No, the labor that we were figuring out, if I remember correctly, was $2.50 to $2.75 per day. That is all the information I can give.

The President—Has anyone else any remarks on this subject?

Mr. Doherty—There might be a chance for argument here. Mr. Ramsdell's figures, which came originally from Mr. Bredel, gave a lower cost for slopers than they do for charging and drawing machinery. On page 35, Mr. Ramsdell gives the cost of slopers at 2¾ to 4 cents per 1,000, and for horizontals, with charging and drawing machines, 3¾ to 4½ cents per 1,000. The minimum and maximum for drawing and charging machines both being higher than the minimum and maximum for inclines.

Mr. Bredel—Not very much difference. There is only possibly the saving of ¼ to ½ a cent in using inclines over horizontals, and that is all it gives here.

Mr. Doherty—I take it if Mr. Carpenter allows that statement to go unchallenged he agrees that inclines do not require so much labor.

Mr. Carpenter—I have already referred to an article that will answer the question. If you want a copy of the paper I think I have one in my grip.

The President—Mr. Thwing, we took up the discussion of the use of machine stoking while you were out of the room, and we would be glad to hear from you on the subject. I understood you were using hand stoking in St. Louis almost entirely.

Mr. Thwing—I do not think I care to speak on the subject, not having the figures up very lately for consideration or comparison. I never have investigated as to the size of plant that will justify machine stoking.

[To be Continued.]

[Prepared for the JOURNAL, by MR. FREDERIC EGNER.]

A Review of the Eighteenth Annual Report of the Massachusetts Board of Gas and Electric Light Commissioners.—No. I.

Few of those who have read the text of the bill creating a Gas Commission for and in the State of Massachusetts, printed in the JOURNAL dated August 17th, 1885, may have favored the measure, but the majority undoubtedly had much doubt as to its utility. A healthy publicity of anything appertaining to the gas business was then, and is still in some quarters, decried and vigorously discouraged.

It was not many years, however, after the Massachusetts Commission was fairly inaugurated when the most advanced thinkers in our profession recognized its worth and utility.

This was evidenced by several of the Presidents of the various Gas Associations commending to favorable consideration not only the work done by this Commission, but recommending the co-operation of those interested in the gas industry everywhere in the United States in attempts to induce the Legislatures of other States to follow the wise example of Massachusetts. Unfortunately, the object so earnestly recommended and honestly tried to be accomplished by several of our Associations has as yet failed, owing to the apathy, to call it nothing more severe, of those who would be most favorably affected if these efforts had been successful—viz., the gas companies themselves for one, and very largely the good public who have to pay the piper, which is at least some consolation. It is to the writer, at any rate.

Attentive gas men were not long left in doubt as to the position or attitude the Commissioners of Massachusetts proposed to take professionally; for, though unofficially, they were represented at every public meeting of consequence among gas men. Evidently, they wished to gain as thorough a knowledge of the business as possible, and did not stop at becoming acquainted with American, but also European conditions affecting the industry in general. And there is today probably not one man better posted upon the whole subject, or able to give a more reliable judgment in connection with our industry than is the

very able Chairman of the Board of Gas and Electric Light Commissioners of Massachusetts, Mr. Forrest E. Barker, who, aside from his official position, is a welcome and honored guest at every meeting of Gas Associations East or West whenever he can attend their gatherings, and which he seldom misses. That he is appreciated is further evidenced by the fact that he has been elected to Honarary Membership in the American, Western and Ohio Gas Associations. On the whole the Massachussets authorities seem to have been exceptionally fortunate in the selection of the personnel of their Commission, who in turn seem not only to have entirely fulfilled the expectations of the wise framers of that measure 18 years ago, but to have so conducted their office as to make themselves noteworthy examples for all who in course of time may come after them.

When we consider the field occupied by the Massachusetts Gas Commission by "companies" very few of the other States could compare with it, excepting New York, Pennsylvania and Ohio. Perhaps that is one reason why other States have been slow in establishing such Commissions.

The ultimate benefit and real saving likely to result from a measure do not nearly impress the average legislator so much as does the actual expense. He is guided in that respect something like the average grain speculator is by "the visible supply." Neither is he much to be blamed for taking such a stand, when one remembers that the average "constituent" cannot see any further or deeper than his "hayseed" representative; but it should be different with the men who are engaged in the gas and electric business. While the Commissioner does not seem to hinder greatly a legitimate capitalization of properties, it certainly is a strong barrier to ignorant or unconscionable raiders, and does interfere for the public as well as the private good with the operations of these, and also unwarranted municipal aggressions, all of which should be duly weighed when counting the cost of maintaining a commission. As a matter of fact, the actual saving to the public and investors alike cannot be estimated by an ordinary mind, such as those for instance quoted, who can take cognizance only of what they can count with their fingers or actually see with their eyes. If the "Fathers of our country" could not have looked further than this comparatively, we would still be a dependency of some foreign country. There is little doubt that the intelligent reader, however, can see the force of the argument without further exemplification, that gas commissioners would pay also in communities not as thickly populated as in the Bay State.

Let us look over the figures submitted in the "Report," for therein we shall find some instructive reading.

For those who do not care for particulars, or those who are interested in the results only, the condition of the gas industry in the State of Massachusetts may be summarized as follows, for the fiscal year ending June 30th, 1902:

Total assets		$39,917,185.52
Total liabilities	$29,996,405.05	
Reserved and depreciation funds	968,167.42	
Surplus	9,052,613.05	
		$39,917,185.52

These figures embrace the financial operations and standing of the 72 (or 74?) companies in the State, of which 24 are also operating electrical plants. When it is said that, according to this report, 5 of the companies "appear not to have earned expenses, and 17 others have not earned sufficient to warrant the declaration of any dividend," then it must be admitted that the gas business in Massachusetts is in a good enough financial condition to make investments in it there not altogether unattractive.

Of these 72 (or 74?) gas plants, 65 furnish coal and water gas, 5 oil gas, and 2 acetylene gas.

Let us now examine details. Here we find much that is of interest to the student of the statistics of his profession, and may especially note that "average figures" are, as a rule, worthless when comparing results with plants of greatly differing magnitudes. The Commissioners, evidently fully aware of this fact, have gone to much trouble and have carefully prepared data enabling anyone to easily find what may be wanted, if one only knows what one does want. A well drawn up index makes search a pleasure, not a task; and the only difficulty the reviewer finds in the matter is to refrain from quoting the whole of the report verbatim, for it seems impossible to improve upon the admirable manner in which all the technical or purely commercial statements are presented by the Commissioners. But as it is out of the question to republish the 415 pages of closely printed matter, of which 222 pages comprise the report proper, and 193 pages go to "appendices," of which 5 pages contain the well tabulated index, it is hoped that the extracts made and quoted from the "Report" in the following lines, will repay the reader for any time he may devote to the reading of them.

Before going further into the subject the writer would mention certain discrepancies which appear when comparing some of the tables of the companies. At the opening of the report the statement is made that "there are now under the supervision of the Board 146 companies, and the gas and electric plants of 15 towns and 2 cities. Of the companies, 50 are engaged in the supply of gas only, 24 in the supply of both gas and electricity; the others supply electricity only." But when counting the companies named it will be found that, on pages 126, 127, only 71 are given; while on pages 141–143, 72 names are given of gas companies, including the 24 that also operate electric light plants; while on pages 163, 164, we find 84 electric light companies named, besides 11 plants which supply electric light but run on private account—the 84 electric light companies include also those which furnish gas. On page 87 are given the names of 17 municipalities, three of which buy the electric current distributed by them, which supply light on municipal account, two of these having both gas and electricity, but which are not named on the other tables.

We have just mentioned that 17 municipalities in the State have gone into the lighting business on their own account, in connection with which the attention of the New York law maker is respectfully invited to make a close inspection of the figures submitted. As many of the readers of the JOURNAL no doubt know, some of the New York dailies have, during the past month or more, agitated the subject of a municipal lighting plant, more *especially with a view to electric lighting*. These efforts of the papers referred to are probably not as disinterested as they appear to the reading public, though in whose interest the apparent opposition to the existing lighting companies of New York City these attacks were made the writer shall not undertake to say. But, while he would personally be much pleased to be intrusted with the office of designing, erecting and perhaps running such a plant for the city, should the municipality eventually engage in such a folly, he would in advance earnestly recommend representatives of the people and the taxpayers to carefully scan the actual results obtained in the enlightened and well governed State of Massachusetts in that line, as disclosed by the report under review. It would probably make very clear to the taxpayers that the great benefits accruing from the establishment of municipal lighting plants, especially the electric branch thereof, are very one sided, in that the leaning is altogether in favor of the people who have electrical appliances to sell, and who—now that private enterprise is pretty well supplied—work most diligently to create a new market for their goods, selecting the "dear public" this time, as the prospective "beneficiaries."

The total investment on municipal account is given as $1,828,708, *and the total loss in operating* account for the electric plants is given as $61,305.04; the gas plants on the other hand showing the wonderful (?) net gain for the year of $3,615.13.

The actual cost per arc lamp, ranging from *so-called* 1,200 to 2,000-candle power lamps is, to these towns, from $42 to $131 per annum apiece, with the more prevailing rates ranging from $76.91 to $86.03 per lamp. This should be very encouraging to the promoters of municipal lighting for New York City? It is probable that these statements will not be accepted as conclusive against the municipal plan, but, as previously mentioned, while the writer would be only too glad to have the job of supplying such a plant, and would warrant it to be the finest up-to-date, if only the money would hold out, yet the figures given do not have a very encouraging look for the project. That municipal plants could be operated as economically as any private plant and every whit as efficiently there cannot be much doubt, if the element of "politics" could be eliminated, and only strictly business methods prevail. But could *that* be done? In all of the writer's experience he has seen but one municipal plant (though there may be others) which was managed upon strictly business principles, and hence beneficially for the municipality, and that was at Danville, Va., under the very able direction (with co-operation of all parties) of Captain C. A. Ballou. Richmond, Va., with Mr. Wm. P. Knowles as the Manager, is a close second; and together they are really shining examples of what may be possible, even under municipal management, if well directed and backed up irrespective of political aggressions and unreasonable demands.

THE Gas Machinery Company, of Cleveland, O., has been awarded the contract for the construction of a coal gas plant for the Middletown (O.) Gas and Electric Company, the apparatus to have a daily capacity of 200,000 cubic feet. The contract also calls for the placing of an ammonia still.

The Manufacturers and the Labor Question.[1]

The extent to which public sentiment has been aroused on the labor question is demonstrated by the proceedings of the National Association of Manufacturers at New Orleans last week. The discussion of this question over-shadowed all other matters brought before the convention. Important topics which would ordinarily have attracted much attention and elicited animated discussion were given scant consideration because of the desire among those present to bring out some phase of the labor situation in which they felt particularly interested. The meeting might have been called a labor convention in view of the fact that so large a part of the time was devoted to the consideration of labor and so little to other matters. In past years the Association did much to direct the attention of its members to the cultivation of an export trade. This year that once engrossing subject was almost wholly ignored. Practically the only action taken having any bearing on the export question was the adoption of a resolution urging the speedy adjustment of trade relations with Russia to terminate the war of reprisals now adversely affecting American trade with that country. Obviously, the manufacturers of the United States must have become thoroughly impressed with the belief that the urgent necessity of the hour is to counteract the growing power of labor unions, or there would have been no such overpowering demonstration on this subject.

The discussion of the labor question in the convention developed a sharp difference of opinion among the members. The great majority of those present were undoubtedly in favor of radical measures against unions, as shown by the demonstrations of approval of the position taken by President Parry and John Kirby, Jr. A little band of conservatives raised their voices in remonstrance against the wholesale denunciation of labor unions, pleading for moderation and urging that no action should be taken which would inflame labor against capital. The convention being composed of level-headed business men, the views of the conservatives were not only given due consideration, but were reflected to the declaration of principles and resolutions on the labor question which were adopted.

A platform was thus built upon which all were able to stand. A plan was also outlined for the formation of employers' associations, to cooperate with a central body, by means of which it is hoped that labor disputes can be more successfully handled than in the past. Through such an organization it is expected that effective work can be done in adjusting labor troubles before they reach the point of a strike or lockout. But when strikes do occur, it is confidently expected that their effects can be minimized and the evils of the boycott and the sympathetic strike mitigated.

An organization of this character has a great work cut out for it. Over and above any selfish consideration of the mere financial interests of employers lie the important questions of the right of free labor in any occupation, the right of the American boy to learn a trade, the evil of restricting output and the suppression of violence during strikes. It is a difficult task, and it will certainly not be accomplished without great sacrifices by those upon whom the burden of leadership may fall.

SPECIAL ENGLISH CORRESPONDENCE.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, ENGLAND, April 10th, 1903.

Natural Gas in Sussex.—Mr. Shadbolt Discourses About Gas.—Some Popular Paragraphs on Lighting.

At a recent meeting of the Chemical Society a paper was read describing some analyses of the natural gas at Heathfield, Sussex, by Messrs. H. B. Dixon and W. A. Bone. The possibility of the industrial application of the Heathfield gas was brought before the Royal Commissioners on Coal Supply last year, and Mr. Dixon, who was a member of the Commission, was asked to visit the site and report on the matter to that body. Several samples of the gas were collected and sealed up in glass tubes on October 10th last and taken to Owens College for examination. Natural gas was first discovered in the locality in 1836, and was again met with during the sub-wealden boring in 1875. It was found at Heathfield in 1895, while sinking a well, and in 1896 it was struck at a depth of 300 feet, near the railway station, and was put into use for the lighting of the premises. At the date of Mr. Dixon's visit, six wells were either completed or in progress, and gas was found in all of them, after penetrating 300 to 400 feet through sandstone and marl, which is said to form an impervious lid to the natural gasholder. Gas issued from the boreholes at a pressure of 150 to 200 pounds per square inch and was used to light the station and a number of houses; also to drive gas engines. Lighted at a 1-inch pipe at the mouth of the borehole, the gas burnt with a large and moderately luminous flame, brighter than that from firedamp in coal mines. It gave little or no light in flat flame burners, but a moderate light with an Argand. The authors give details of the chemical tests, which prove the absence of carbonic oxide, oxygen, hydrogen and uncarburetted hydrocarbons, and show the following composition:

Methane	93.16
Ethane	2.94
Carbon monoxide	1.00
Nitrogen	2.90

This is an excellent showing as indicating a high quality gas. The photometrical value is certainly low, but that is not now of much consequence, as the heating value of such a mixture as that above indicated would be 850 to 900 units per cubic foot, or 30 per cent. better than ordinary coal gas. The commercial future of the Heathfield gas depends upon the quantity available. If this proves to be ample, the prospects of a cheap fuel of such excellent quality will attract many industries towards the neighborhood.

Members of the Gas Manager's Association know something of the ability and industry centred in Mr. Shadbolt, of Grantham, as evidenced by his labors on the Sunday labor question and other matters relating to the welfare of our industry. How these attributes can be well applied in the interests of the undertaking which Mr. Shadbolt ably manages, was well illustrated a few days ago, when, on the occasion of an exhibition of gas appliances held in the Corn Exchange, a large audience gathered to hear a lecture on the value of coal gas for lighting, heating and power. An electric supply company has been started at Grantham with the usual disingenuous attitude towards gas, which is best met by plain statements of fact. Adopting this safe and sure method, the lecturer successfully exposed the fallacy of a statement, industriously circulated in the district, to the effect that electricity at 5d. per unit is equivalent to gas at 2s. 11d. per 1,000 cubic feet. Taking the lighting value claimed for electricity by its promoters, he showed that this estimate gave less than 1¼ candles per cubic foot of gas. Whereas the duty obtainable from gas ranged from 3 up to 40 candles per cubic foot, according to the kind of burner used. Taking the quantity of gas required to give the same amount of light as a unit of electricity, he showed that the true value of gas used in flat flame burners was not 2s. 11d. as stated, but 5s. 5d.; with Argand burners it was 6s. 9d.; with regenerator burners 15s. 8d.; with an ordinary incandescent burner 26s.; a good incandescent burner 34s. 8d.; a Kern burner 43s. 4d. So far this referred to glow electric lamps, but he proceeded to deal with the electric arc lamp, which was stated to be "the cheapest light in the world" by the electricians. Accepting the statement that with the arc lamp 1 unit gave a light of 2,000 candles for 1 hour, he showed that the same result could be obtained by the intensified system with 57 cubic feet of gas, and that the gas was considerably more than twice as cheap as "the cheapest light in the world." Passing on to heating values, he showed that for boiling water 10 cubic feet of gas were as good as a unit of electricity, and for motive power, again accepting the claim of the Electric Supply Company, the equivalent of a unit was 20 cubic feet of gas. Taking an average over the whole of his results, he showed that the real value of gas was 6½ times as great as the figure given by the electricians. In concluding, he expressed the hope that his efforts would enable them to arrive at a true conception of the value of gas.

The Grantham Gas Company have succeeded in retaining the public lighting, a tender submitted by them having been accepted by the Town Council. The tender was in accordance with a specification prepared by the Lighting Committee, which includes 20 lamps of not less than 750-candle power, 3 of not less than 160, 14 not less than 50, and 350 not less than 25-candle power, and the minimum hours of consumption are to be 2,800 per annum. The inclusive price for the whole 387 lamps is to be £1,258 per annum. Granthan is a moderate sized provincial town, and the first impression on reading the schedule is the great advancement in ideas as to public lighting that has obtained since, by the introduction of the Welsbach burner, it has been practically demonstrated that a brilliant, reliable light can be provided at a very moderate expense. Probably the Grantham Town Council's idea of sufficient lighting, say in 1890, would run in the ordinary direction of 200 to 250 ordinary 5 cubic feet burners, or about 3,750 candles in all, while the above schedule provides for 26,000 candles. I go into these details because Grantham furnishes a fair example of what is being done at other places. In larger towns and in London it is the same story. More lamps

1. *Iron Age.*

in the side streets, more candle power in the principal thoroughfares and at crossings or refuges. Even small towns and villages are following suit. In a little place of 2,000 inhabitants I recently fitted up a dozen 300-candle power self-intensifying Welsbach burners at the principal crossings. These are mounted on columns of sufficient height to bring the flame 15 feet above ground level, and in most instances are central—*i. e.*, in the center of the triangular space formed by three roads meeting, or in the center of a square, and this is an important point. Powerful lights like these are half neutralized by buildings in close proximity, such as happens when they are placed on the curb of a narrow sidewalk. These lamps are fitted with a new glass mantle protector, in shape almost globular, with 2 short necks. It is a combination of a globe and a chimney, but the effect in apparently magnifying, and diffusing the light is remarkable, and renders the appliance far superior to the ordinary electric arc for which anything up to 2,000-candle power is claimed. No clamor whatever has been raised as to extra expense, and the additional light has given great satisfaction. As with the larger towns, there has been a great advance in ideas as to what constitutes efficient public lighting. Within the last 20 years the little town just instanced dispensed with public lights entirely for the whole of one winter, and though that experiment was not repeated, there was always great parsimony exercised in regard to the public lighting.

The above remarks are accentuated by a paragraph under the heading of "Tit-bits" of general information which appears in a popular periodical of the day, and is worth quoting in full. It is as follows: "As proof of the extraordinary advance that is being made in the metropolis in incandescent gas lighting it is stated that within the past few years as many as 18,000 street lamps have been fitted on the incandescent system, or practically six-sevenths of all the public lamps of London, which number nearly 22,000. The system is being so extensively used for private lighting that one of the gas companies sells as many as 750,000 mantles every year, independent of the mantles supplied and maintained by private firms for the users of the company's gas." But against this the same column contains a paragraph on "Light from Microbes," describing a lamp discovered by an Austrian Professor, in which the work is done by means of bacteria, by which means a powerful light free from danger is afforded, that can be used without risk in mines or powder magazines. The lamp consists simply of a glass jar, in which a lining of saltpetre and gelatine innoculated with bacteria is placed. Two days after innoculation the jar becomes illuminated with a bluish green light, which shows brilliantly for two or three weeks, after which it begins to diminish. The light is caused by innumerable bacteria, and renders faces recognizable at a distance of two yards, and large type is easily legible. This all looks well. There is nothing complicated or costly about a glass jar with a lining of saltpetre and gelatine, and bacteria can be raised fairly cheap, since they increase and multiply by the million. The "bluish green light" does not sound very cheerful, and a drawing room illuminated by a large number of bacterial jars might be interesting to the scientist, but would scarcely be satisfactory or attractive to the average man or woman. But no doubt the professor who has discovered these new light givers, which seem to be a sort of microscopical glow-worm, will be able to induce them to turn their attention to the other end of the spectrum and do something in the way of red and yellow rays. Having done this he might see what can be done in the way of heat. If bacteria can produce one form of energy out of nothing, they can also do another, but it seems that the motto, "*ex nihil nihil fit*," will have to come out of the dictionary, or at any rate be revised. I have frequently been impressed with the faet that glow-worms and other low orders of life produce a fairly brilliant light with an apparently inappreciable expenditure of energy or material, and the Austrian discovery appears to open up new and hitherto unattained possibilities. However, for the present, and probably for the rest of our natural lives, we can go on making gas. It is evident that light is a very cheap form of energy, when produced neat, and that our present methods are cumbersome and extravagant. There is unlimited scope in the way of increasing the duty afforded by gas burners, and the advancement of from 3 candles in 1890, to 40 or more in 1903, per cubic foot of gas used per hour, as already achieved, give good promise for the future.

THE re-organization of the Laclede Gas Company, of St. Louis, Mo., has been completed. The executive management is as follows: Directors, Julius S. Walsh, Breckenridge Jones, Chas. Huttig, Wm. F. Nolker, E. G. Cowdery, C. W. Wetmore, Geo. R. Sheldon, John I. Beggs and E. M. Buckley; President, C. W. Wetmore; Vice-Presidents, Breckenridge Jones and E. G. Cowdery; Treasurer and Secretary, Alexander Ross; General Manager, E. G. Cowdery.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE New Haven (Conn.) Gas Light Company has placed the contract for its new coal gas plant with the Riter-Conley Manufacturing Company, of Pittsburg, Pa. The retort house will have a capacity of 2,000,000 cubic feet per day, and it is arranged for easy extension to an output of twice the initial quantity. The coal storage house will hold 20,000 tons, which structure is also arranged for duplication. West compressed air stoking machinery will operate the retort house, and the coal and coke will be handled by the most improved devices.

The following newsy letter is from Mr. F. H. Shelton, dated the 17th inst.:

"The increase of business in the small town of Media, Pa., has been so marked in the past year that it seems to me as an object lesson of what can be done in developing new business, it is well worthy of calling it to the attention of other gas companies. Media is a town of 3,500 people, 14 miles from Philadelphia. residential in character, with no manufacturing or industry, excepting that of lawyers, it being a county seat. It has had gas service for 20 years, and the old rates were $1.50. One year ago the Company was purchased by the Suburban Gas Company, of Philadelphia, and consolidated into its system. A local office, however, is maintained and the business done is recorded separately from the other districts operated by the Company. April 1st, there were 301 meters, which were raised during the year to 606. The services were raised from 301 to 612. The gas ranges numbered about 60 and were raised to 297; 38 lamp posts have been installed where none previously existed; 3 gas engines were increased to 5; 10 water heaters were increased to 105; 77 hot plates, 304 radiators, 6 gas grates and 27 miscellaneous appliances were sold, in addition to the gas ranges above; and of "arc lamps," 41 of the outside pattern and 130 for inside use were set. The sales of the old management were 4,577,400, while the sales in the past year went up to 12,260,900. Some of this (1,956,900) was on extensions of new mains, but the amount sold on the old mains was 10,304,000, or 2¼ times that of last year. Bearing in mind the small population, it must be evident that the above is a most excellent record. It is due to the right policy, primarily, of the management; to the willingness to invest money to follow up and get more business; to the confidence that such business can be procured, and to the intelligent, pushing-for-it locally by Mr. W. H. Yocum, the Superintendent in charge of the Media branch, and the oversight of Mr. J. D. Shattuck, the General Local Manager. The price of gas in the above town is $1.25. The gas comes under some 30 pounds pressure from the city of Chester by a roundabout course of 6, 4 and 3-inch pipe, some 7 or 8 miles. It would not appear from the above that the loss of candle power from compression, one of the bogies alleged against the desirability of high pressure work, makes much difference in the efficiency of the gas, or in its sales at the far end. The gas made in Chester is a 22-candle power water gas. There is no photometer in Media. The readings of the consumer's ledger to us are sufficiently satisfactory."

AFTER the 1st prox. the office of Mr. G. A. Bronder will be removed from 38 Witehall street to No. 229 Broadway, corner of Barclay street, New York.

MR. ANDREW V. CRAWFORD, Superintendent of the Federal Gas and Fuel Company, Columbus, O., died at his home in that city, the morning of the 13th inst. He was in his 39th year, having been born in Logan, O., June 11th, 1864.

MR. WILLIAM H. RAMSEY has been appointed Inspector of Illuminating Gas and Gas Meters for Allegheny county, Pa. He was formerly State Oil Inspector for Pennsylvania.

A CORRESPONDENT in Wilmington, Del., forwards the following under date of the 17th inst.: Governor Hume has signed the gas inspector bill, and Plumbing Inspector Kane will take charge as inspector upon the enactment of an ordinance by the City Council in accordance with the provisions of the law—Councils also have the authority to appoint an Assistant Inspector on the request of the Chief Inspector. The following are the provisions of the act:

"Section 1. From and after the 1st day of May, A. D., 1903, the Inspector of Plumbing, of the city of Wilmington, shall assume the duties of Gas Inspector in and for the said city, and shall perform the duties hereinafter provided for.

"Section 2. Before entering upon the duties of his office, the said Gas

Inspector shall give bond to the Mayor and Council of Wilmington with good and satisfactory security, in the sum of $1,000, conditioned for the faithful performance of his duties, such bond to be approved by the said Council of the city of Wilmington.

"Section 3. He shall receive as Gas Inspector the sum of $500 per year, payable monthly.

"Section 4. Should the Gas Inspector at any time require the services of an assistant, he shall report the facts to the City Council, and the said Council may, if in their judgment they deem it necessary, appoint an assistant for such time and at such salary as they may determine.

"Section 5. The said Mayor and Council of Wilmington shall have power and are hereby authorized and directed to adopt and promulgate suitable rules and regulations governing and regulating gas pipes and fittings in the city of Wilmington, in buildings that may hereafter be erected, and provide for the enforcement of such rules and regulations, and further make provision for the punishment of person or persons who shall refuse or neglect to comply with the same.

"Section 6 The said Mayor and Council of Wilmington may also, by rules and regulations, establish a system of inspection and supervision of gas pipes, fittings and fixtures in buildings now erected.

"Section 7. The Gas Inspector shall make a daily inspection and test of the gas as to candle power and report the result of said test to Council monthly.

"Section 8. Any consumer of gas can have his meter tested under the supervision of the Gas Inspector upon filing application for same. If meter proves correct, in accordance with United States standard, the applicant shall pay costs of said test, provided, however, the cost shall not exceed 50 cents. If the said meter should conform to above standard the costs of said test shall be borne by the Gas Company.

"Section 9. All fees so collected shall be paid monthly into the treasury of the city of Wilmington.

"Section 10. All acts or parts of acts inconsistent herewith are hereby superseded."

It is reported that the plant at Seneca Falls, N. Y, has been purchased by those interested in the gas supply of Auburn, N. Y.

The executive management named by the shareholders of the Jackson (Mich.) Gas Company is as appended: Directors, H. D. Walbridge, Emerson McMillin, N. S. Potter, T. A. Wilson, S. H. Cargall, W. M. Eaton and S. E. Wolff; General Manager, S. E. Wolff.

At the annual meeting of the Chuctanunda Gas Light Company, of Amsterdam, N. Y., a dividend of 5 per cent. was declared. The retiring officers were re-elected, and the annual reports showed that the output for the twelvemonth was not far from 44,000,000 cubic feet. It looks to us that the proprietors could largely increase the sendout by a series of well planned main extensions.

The feature of the last regular meeting of the Louisiana Engineering Society was an excellent paper by Mr. Thomas D. Miller, General Manager of the New Orleans Lighting Company, whose topic was "Gas and Its Manufacture." The following interesting paragraph is taken from it: "The New Orleans Gas Light Company was incorporated February 7th, 1829, but the charter was declared forfeited in 1833, when James H. Caldwell was given the exclusive privilege to vend gas in New Orleans. In 1835 Caldwell transferred his franchise to the New Orleans Gas Light and Banking Company, by act of the Legislature, and in 1881 an opposition company was projected, but after 4 years' litigation in which the case reached the Supreme Court of the United States, the old Company was confirmed in the exclusive privilege of furnishing gas to the city. At first the Company was prohibited from demanding more than $6 per thousand cubic feet, and later this was reduced to $4.50 per thousand by Legislative enactment. The first plant, consisting of three benches each, with 3 iron retorts, was erected at the corner of Gravier and Locust Streets, in 1836, which was subsequently enlarged in 1850 or 1852 to 16 benches of 3 iron retorts each. In 1860 still more additions were made, and still again in 1868. When the consumption of gas reached 1,100,000 cubic feet per day in 1875, the retort house at the corner of Perdidio and Magnolia streets was built. In 1883 the Egerton process was introduced, known as water gas. In 1895 a standard Lowe water gas process was installed and that is the one still in use. New Orleans had the the second gas works in this country."

At a special meeting of the stockholders of the Marshall (Mich.) Gas Light Company, the plant and properties of which were recently sold to a syndicate headed by Burdette D. Bowne, of Grand Rapids, Mich. The following officers were elected: President, B. D. Bowne; Vice-President, H. W. Douglas; Treasurer, C. E Gorham; Secretary, John E. More. It is proposed to change the system of manufacture to coal gas.

Manager Dunbar, of the Elgin (Ills.) American Gas Company, has planned for the placing of 10 miles of additional mains this season. The West Side of the city will come in for the lion's share of the piping.

The gas and electric lighting interests of Taylorville, Ills., have been consolidated.

Mr. W. J. Hayes, of Cleveland, O., who has acquired the bonds of the Clyde (N. Y.) Gas and Electric Company, proposes to restore the gas plant at that point, which has been shut down for some months

---

At the annual meeting of the Rochester (N. Y.) Gas and Electric Company the officers chosen were: Directors, Geo. W. Archer, Fred. Cook, A. H. Harris, J. R. Judson, W. L. Cole, Wm. Runkle, Walter Johnson, C. B. Judson, Geo. C. Hollister, Granger A. Hollister, Geo. A. Redman, H. L. Brewster and John N. Beckley; President. Geo. W. Archer; First Vice-President, Chas. B. Judson; Second Vice.President, Wm. Runkle; Secretary and Assistant Treasurer, J. R. Judson; Treasurer, W. L. Cole.

The selling rate for illuminating gas at Jeffersonville, Ind., has been put at $1.10 per 1,000, less 10 cents off for cash.

The indebtedness of the Pittsfield (Mass.) Coal Gas Company is to be increased—subject to the approval of the Board of Gas and Electric Light Commissioners—in the sum of $150,000, equally divided in bonds and stock.

The gas plant at Springfield, Ills., is to be rebuilt. The present nominal owners thereof are Messrs. E. W. Clark & Co.

A. M. Halmer has filed a suit in equity in the Prothonotary's office in Stroudsburg, Pa., asking that a receiver be appointed for the Monroe County Gas Company. The petitioners are Joseph Ward, Jr., of Newark, N. J.; Thomas Hines and Thomas H. Hines, of Jersey City, and Wm. Ward and Joseph Ward, Jr., all bondholders.

Success.

Electricity in a recent issue put forth the following sensible editorial remarks, anent the young electrical engineer, that will apply with pretty equal force to the young gas engineer, be he of the curriculum or of the gas house type. Our contemporary said:

Success does not necessarily mean accumulating wealth. We cannot all be multi-millionaires, but we can all do our duty in whatever sphere of life circumstances may have placed us, and if you really do your duty, whether it be scrubbing floors, tending a dynamo, superintending a power plant or managing a manufacturing concern, you will have achieved success.

You may not possibly be accumulating much money, but you will be honestly earning enough to purchase shelter, food, clothes and a few comforts, and at the same time have the satisfaction of knowing in your soul that you are leading an honorable life and can look forward to better things. Do not get discouraged and down-hearted if your affairs do not always go as in your opinion they should. Make the best of things when they do go wrong. Keep cheerful and do not worry. If things always went along smoothly how satiated with monotony we would get. Keep a stiff upper lip and work cheerfully along, bearing in mind the old saying, "All things come to him who waits," and they might have added "and keeps his eyes open."

You nor no one else can make opportunities, but you can avail yourselves of them when they present themselves. If one of such perchance in passing should knock at your door—as they say it knocks at every one's door at least once during a lifetime—don't follow the example of some people and lack sufficient kinetic energy to rise and let it in, but throw your house open and seize it firmly with both arms and make the most of it. To do this properly it is necessary to keep up to date, for in these days of rapid progress if you do not keep up with the band you cannot expect to hear the music.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

MONDAY, APRIL 27, 1903.

The Market for Gas Securities.

The Legislature adjourned yesterday (Thursday), and the net results of its doings may not be characterized as in any sense having been prejudicial to holders of gas and electric shares throughout the State. The plaints of Colonel Robert Grier Monroe to try his prentice hand in the operating of a municipal electric lighting plant for New York city were emphatically negatived, and the bill perfecting the title of the New York and East River Gas Company to certain rights in Queens county was assented to. Some say that the latter will be vetoed, but from our point of view the chances are greatly in favor of the signature necessary to cause the measure to become operative. It certainly does harm to none.

Consolidated advanced sharply, the rise culminating on Thursday. The closing to-day was made at 211½ to 212½, a net gain of 5½ points in the bid price for the week. The course of the stock should be toward a much higher level, and at once. Brooklyn Union is nominally 215 to 225. Peoples, of Chicago, retains the the gain chronicled in it a week ago, and Washington (D. C.) gas is 425 to 430. Consolidated, of Baltimore, is steady, and the same may be said of Lacledes. The curious are speculating as to what the capitalization changes at the hands of its new owners will be.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks,

16 WALL STREET, NEW YORK CITY.

APRIL 27.

☞All communications will receive particular attention.

☞The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	211⅛	212½
Central Union, Bonds, 5's	3,000,000	1,000	109	111
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	118	120
Metropolitan Bonds	658,000	..	108	112
Mutual	3,500,000	100	310	325
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co. ..				
Bonds, 5's	11,000,000	1,000	108⅛	109
Northern Union, Bonds, 5's.	1,250,000	1,000	104	107
New York and East River				
Bonds 1st 5's	3,500,000	1,000	112	113
" 1st Con. 5's	1,500,000	..	109	111
Standard	5,000,000	100	132½	140
Preferred	5,000,000	100	152	160
Bonds, 1st Mortgage, 5's	1,500,000	1,000	115½	118
Yonkers	299,650	500	130	.
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	215	225
" " Bonds (5's)	15 000,000	1,000	119	119½
Bay State	50,000,000	50	⅝	⅞
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	28	30
" 1st Mtg. 5's	509,000	1,000	93	96
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	7	10
" " Bonds, 5's	5,250,000	1,000	73	76
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Central San Francisco	900,000	..	106	108
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas & Elec. Co.	29,500,000	100	97	98
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	101	101½
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	88¾	89¼
Preferred	3,026,500	100	107½	109
Consumers, Jersey City Bonds	600,000	1,000	103	106
Consumers, Toronto	1,700,000	50	218	225
Consolidated, Baltimore	11,000,000	100	69½	70
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	15	17
" Con. Mtg. 5's	880,000	1,000	85	87
Consolidated G. & E. Co.'s.				
Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co	4,825,500	50	..	89
" Prior Lien 5's	5,603,000	1,000	99½	100
Detroit Gas Co., 5's	82,000	1,000	77	79
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	39	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	245	265
Hudson County Gas Co., of New Jersey	10,500,000	..	25	..
" Bonds, 5's	10,500,000	..	101	103
Indianapolis	2,000,000	..	80	85
" Bonds, 6's	2,650,000	..	105	107
Jackson Gas Co	250,000	50	73	75
" 1st Mtg. 5's	290,000	1,000	101	102½
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	97	101
Preferred	2,500,000	100	100	120
Bonds	10,000,000	1,000	109½	110
Lafayette Gas Co., Ind.	1,000,000	100		60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	130	140
Madison Gas & Elec. Co.				
" 1st Mtg. 6's	350,000	1,000	107½	108½
" 6 per cent. scrip, due 1910	100,000	25	85	87
Montreal, Canada	2,000,000	100	218	184¾
Nashville Gas Lt. Co.	1,000,000	100	110	..
Newark, N. J., Con. Gas Co	6,000,000	..	56	58
Bonds, 6's	4,600,000	..	105	105¾
New Haven	1,000,000	25	300	325
Oakland, Cal.	2,000,000	..	46	47
" Bonds	750,000	..	..	.
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	104⅛	104¾
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	10,000,000	100	54	55
St. Joseph Gas Co.				
" 1st Mtg. 5's	751,000	1,000	95	96½
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	92	93
Syracuse, N. Y.	1,975,000	100	42	45
Bonds	2,047,000	1,000	98½	99½
Washington, D. C	2,600,000	20	425	440
First mortgage 6's	600,000	..	..	..
Western, Milwaukee.				
Bonds, 5's	4,000,000	..	109½	110
Wilmington, Del.	600,000	50	232	.

Advertisers' Index.

GAS ENGINEERS.

A. E. Boardman, Brevard, N. C. 672
Baxter & Young, Detroit, Mich. 672
David Leavitt Hough, New York City. 672
Economical Gas Apparatus Construct'n Co., Toronto, Ont. 664
Frank D. Moses, Trenton, N. J. 659
Fred. Bredel Co., Milwaukee, Wis. 660
Geo. R. Rowland, New York City. 662
Humphreys & Glasgow, New York City. 673
Kerr Murray Mfg. Co., Fort Wayne, Ind. 674
The Gas Machinery Co., Cleveland, O. 659
The Jeffrey Manufacturing Co., Columbus, O. 669
The Western Gas Construction Co., Fort Wayne, Ind. 640
United Gas Improvement Co., Philadelphia, Pa. 677
Wm. Henry White, New York City. 675

GAS WORKS APPARATUS AND CONSTRUCTION.

A. E. Boardman, Brevard, N. C. 672
Bartlett, Hayward & Co., Baltimore, Md. 673
Baxter & Young, Detroit, Mich. 672
Christopher Cunningham, Brooklyn, N.Y. 669
Connelly Iron Sponge and Governor Co., New York City 634
Continental Iron Works, Brooklyn, N. Y. 674
Davis and Farnum Mfg. Co., Waltham, Mass. 672
Deily & Fowler, Philadelphia, Pa. 676
Economical Gas Apparatus Construct'n Co., Toronto, Ont. 664
Frank D. Moses, Trenton, N. J. 659
Fred. Bredel Co,, Milwaukee, Wis. 660
G. Shepard Page's Sons, New York City. 672
Humphreys & Glasgow, New York City. 673
Isbell-Porter Company, New York City. 674
Kerr Murray Mfg. Co., Fort Wayne, Ind. 672
Lloyd Construction Co., Detroit, Mich. 662
Logan Iron Works, Brooklyn, N. Y. 676
Quintard Iron Works, New York City. 673
R. D. Wood & Co., Philadelphia, Pa. 674
Riter-Conley Mfg. Co., Pittsburg, Pa. 675
Stacey Mfg. Co., Cincinnati, O. 675
The Connersville Blower Company, Connersville, Ind. 677
The Gas Machinery Co., Cleveland, O. 659
The Jeffrey Manufacturing Co., Columbus, O. 669
The Western Gas Construction Co., Fort Wayne, Ind. 640
United Gas Improvement Co., Philadelphia, Pa. 667

PROCESSES.

Bartlett, Hayward & Co., Baltimore, Md. 673
B. E. Chollar, St. Louis, Mo. 662
Burdett Loomis, Hartford, Conn. 674
Economical Gas Apparatus Construct'n Co, Toronto, Ont. 674
Humphreys & Glasgow, New York City. 673
The Gas Machinery Co., Cleveland, O. 659
The Western Gas Construction Co., Fort Wayne, Ind. 640
United Gas Improvement Co., Philadelphia, Pa. 667

SCRUBBERS AND CONDENSERS.

Continental Iron Works, Brooklyn, N.Y. 674
Kerr Murray Mfg. Co., Fort Wayne, Ind. 672
Logan Iron Works, Brooklyn, N. Y. 676
R. D. Wood & Co., Philadelphia, Pa. 674
Riter-Conley Mfg. Co., Pittsburg, Pa. 675
The Gas Machinery Co., Cleveland, O. 659
The Western Gas Construction Co., Fort Wayne, Ind. 640

PRODUCER POWER PLANTS.

R. D. Wood & Co., Philadelphia, Pa. 674

TAR AND CARBONIC ACID EXTRACTOR.

The Gas Machinery Co., Cleveland, O. 659
The Western Gas Construction Co., Fort Wayne, Ind. 640

AMMONIA CONCENTRATORS.

Michigan Ammonia Works, Detroit, Mich. 655
The Gas Machinery Co., Cleveland, O. 659
The Western Gas Construction Co., Fort Wayne, Ind. 640

GAS METERS.

American Meter Co., New York and Philadelphia. 679
Detroit Meter Company, Detroit, Mich. 689
D. McDonald & Co., Albany, N.Y. 677
Helme & McIlhenny, Philadelphia, Pa. 679
John J. Griffin & Co., Philadelphia, Pa. 680
Keystone Meter Co., Royersford, Pa. 678
Maryland Meter and Mfg. Co., Baltimore, Md. 678
Metric Metal Co., Erie, Pa. 679
Nathaniel Tufts Meter Co., Boston, Mass. 678

PREPAYMENT METERS.

American Meter Co., New York and Philadelphia. 679
D. McDonald & Co., Albany, N. Y. 677
Helme & McIlhenny, Philadelphia, Pa. 679
John J. Griffin & Co., Philadelphia, Pa. 680
Keystone Meter Co., Royersford, Pa. 678
Nathaniel Tufts Meter Co., Boston, Mass. 678

PREPAYMENT METER ATTACHMENTS.

Reeves Mfg. Co., New Haven, Conn. 660

GAS AND WATER PIPES.

Charles Millar & Son Co., Utica, N. Y. 664
Christopher Cunningham, Brooklyn, N.Y. 669
Donaldson Iron Co., Emaus, Pa. 664
M. J. Drummond & Co., New York City. 664
R. D. Wood & Co., Philadelphia, Pa. 674
Warren Foundry and Machine Co., New York City. 664

SPECIALTIES FOR OIL AND PIPE LINES.

S. R. Dresser, Bradford, Pa. 661

GAS MAIN STOPPERS.

Safety Gas Main Stopper Co., N.Y. City. 664

GAS TAPPING MACHINES.

George Light, Dayton, O. 664
H. Mueller Manufacturing Company, Decatur, Ills. 661

GAS COALS.

Berwind-White Coal Mining Co., New York and Phila. 670
Perkins & Co., New York City. 670
Westmoreland Coal Co., Philadelphia, Pa. 671

CANNEL COALS.

Perkins & Co., New York City. 670

AUTOMATIC WEIGHING MACHINERY.

Richardson Scale Co., New York City. 660

CONVEYORS.

C. W. Hunt Company, New York City..... 661
G. A. Bronder, New York City..... 656
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 672
The Gas Machinery Co., Cleveland, O..... 659
The Jeffrey Manufacturing Co., Columbus, O..... 669
The Link-Belt Machinery Co., Chicago, Ills..... 671
The Western Gas Construction Co., Fort Wayne, Ind... 640

CHARGING BARROWS & COAL WAGONS.

Kerr Murray Mfg. Co., Fort Wayne, Ind..... 672

GAS ENRICHERS.

Gulf Refining Co., Pittsburg, Pa..... 670
Standard Oil Co., New York City..... 671
The Sun Oil Co., Pittsburg, Pa..... 671

COKE CRUSHERS.

C. M. Keller, Columbus, Ind..... 671
The Jeffrey Manufacturing Co., Columbus, O..... 669

STEAM BLOWER FOR BURNING BREEZE.

The Connersville Blower Company, Connersville, Ind... 677

ECONOMIZERS.

Green Fuel Economizer Co., Matteawan, N.Y..... 662

GAS GAUGES.

The Bristol Co., Waterbury, Conn..... 669

GAS GOVERNORS.

Connelly Iron Sponge and Governor Co., New York City 623
Isbell-Porter Co., New York City..... 674
R. D. Wood & Co., Philadelphia, Pa..... 674

CEMENTS.

C. L. Gerould, Galesburg, Ills..... 668

RETORTS AND FIREBRICKS.

Adam Weber Sons, New York City..... 668
Baltimore Retort and Firebrick Co., Baltimore, Md..... 668
Brooklyn Firebrick Works, Brooklyn, N. Y..... 668
Cyrus Borgner, Philadelphia, Pa..... 668
Henry Maurer & Son, New York City..... 668
James Gardner, Jr., Co., Pittsburg, Pa..... 668
J. H. Gautier & Co., Jersey City, N. J..... 668
Laclede Firebrick Mfg. Co., St. Louis, Mo..... 668
Missouri Firebrick Co., St. Louis, Mo..... 668
Parker-Russell Mining and Mfg. Co., St. Louis, Mo..... 657
The Kreischer Brick Mfg. Co., New York City..... 668

INCLINED RETORTS.

Adam Weber Sons (Graham, Morton [England] System) 658
Connelly Iron Sponge & Gov. Co. (Drake's [Eng.] System) 623

VERTICAL S'S.

Adam Weber Sons (Oscar B. Weber's Construction)..... 658
Connelly Iron Sponge & Gov. Co. (Drake's [Eng.] System) 623

REGENERATIVE FURNACES.

Adam Weber Sons, New York City..... 668
Bartlett, Hayward & Co., Baltimore, Md..... 673
Fred. Bredel Co., Milwaukee, Wis..... 660
J. H. Gautier & Co., Jersey City, N.J..... 668
Laclede Firebrick Mfg. Co., St. Louis, Mo..... 668
Missouri Firebrick Co., St. Louis, Mo..... 668
Parker-Russell Mining and Mfg. Co., St. Louis, Mo..... 657

SELF-SEALING MOUTHPIECE DOORS.

Continental Iron Works, Brooklyn, N.Y..... 674
Isbell-Porter Co., New York City..... 674
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 672
Logan Iron Works, Brooklyn, N.Y..... 676
R. D. Wood & Co., Philadelphia, Pa..... 674
The Gas Machinery Co., Cleveland, O..... 659
The Western Gas Construction Co., Fort Wayne, Ind... 640

CHIMNEY CONSTRUCTION.

Adam Weber Sons, New York City..... 668

INCANDESCENT GAS LAMPS.

Ball Check Light Co., New York City..... 659
Detroit Arc Gas Light Co., Detroit, Mich..... 656
D. M. Steward Mfg. Co., Chattanooga, Tenn..... 660
Welsbach Company, Gloucester, N. J..... 666

(*Continued on page* 656.)

STOCKHOLDERS' MEETING.

OFFICE OF THE UNITED GAS IMPROVEMENT CO.,
N. W. CORNER BROAD AND ARCH STS.,
PHILADELPHIA, PA., February 27, 1903.

The Annual Meeting of the Stockholders of the United Gas Improvement Company will be held at the office of the Company, northwest corner of BROAD AND ARCH STS., PHILADELPHIA, on Monday, May 4, 1903, at 12 o'clock, noon, for the purposes of electing a President and six Directors, to serve for the ensuing year, considering and acting upon the subject of a proposed increase in the capital stock of the Company from 565,000 shares, of the par value of $50 each, to 734,500 shares, of the par value of $50 each, and transacting such other business as may properly come before the meeting.

The stock transfer books will be closed from 3 P.M., April 28, until 9 A.M., May 5th.

By order of the Board of Directors.

1448-8 LEWIS LILLIE, Secretary.

COOKING BY GAS.

MISS RUTH WILKINS,

Lecturess on Cooking by Gas.

Terms and references sent on request. Address,
1453-4 509 N. CHURCH ST., ROCKFORD, ILLS.

Position Wanted

AS MANAGER OF A GAS COMPANY,

By a man thoroughly competent. Am successful in all details of the business, with several years' experience,
1452-tf Address, "G. A.," care this Journal.

Position Wanted

With a Gas Company,

By a young man. Can run transit and level for new mains. Ten years' experience in the gas business. Good reasons for changing present position.
1455-1 Address, "MAINS," care this Journal

POSITIONS WANTED

By Two Young Men,

With Western gas company. Thoroughly experienced in the manufacturing of

GAS METERS.

1455-1 Address, "METERS," care this Journal.

WANTED,

Position as Superintendent or Manager

Of coal, water or natural gas plant, by a competent, hustling business man, 37 years of age. Twelve years with present company. Good references.
1455-3 Address, "S. Q.," care this Journal.

FOREMAN WANTED,

By a company operating a small but well equipped coal gas works. Must understand manufacture and distribution, and be a worker. None other need apply. A good job for the right man.

Address, "FOREMAN, No. 1,"
1455-tf Care this Journal.

WANTED.

A gas company, with an output of 100 million annually, desires the services of a man to take charge of works and street departments. Address, "G. M.,
1455-1 Care this Journal.

GENERAL MANAGER

Is open for engagement with a medium or large gas works. Is up to date. Master of detail and distribution. Used to men. Has a thorough practical knowledge of all departments of a gas works.
1455-1 Address, "GAS MANAGER," care this Journal

FOREMAN WANTED,

Competent to be Assistant Superintendent.

Coal and water gas works; 50,000,000 output. Educated man preferred. Write fully, stating experience. Address,
1455-1 "FOREMAN," care this Journal.

WANTED,

FIRST-CLASS MAN,

—TO—

Erect Ironwork

—FOR—

Coal Gas Plants.

Must be first class rigger and mechanic.
1455-2 Address, "G. E. C.," care this Journal.

WANTED,

AN EXPERIENCED GAS MAKER,

To operate the Lowe, improved water gas apparatus. Annual output 40,000,000.

Address, "S.,"
1454-3 Care this Journal.

PARTNER WANTED.

Experienced Man in Gas Business Wishes Partner,

To erect gas works in one or two good towns. Will put services against money interest. Equal division. Address, "FIDELITY,"
1454-4 Care this Journal.

MANAGER WANTED

For Gas Appliance Department.

A man capable of managing a gas appliance department in a town of 100,000 inhabitants. Must be conversant with advertising and modern methods. Address, with references and salary expected, "WESTERN,"
1454-3 Care this Journal.

FOR SALE, CHEAP.

SET OF 4 PURIFIERS.

Six feet by 10 feet 6 inches by 3 feet, with 8-inch connections; wet centerseal and overhead hoists. Address, the
1453-3 PEOPLES GAS LIGHT CO., RUTLAND, VT.

FOR SALE.

20-horse Power Otto Gas or Gasoline Engine,

In first-class condition. Address,
EARLE H. BUCK,
1452-tf Mgr. Citizens Gas Co., Vincennes, Ind.

FOR SALE.

5-FOOT WATER GAS APPARATUS.

Address, CHARLES G. M. THOMAS,
1449-tf Flushing, N. Y.

FOR SALE, CHEAP.

Six purifying boxes, 6 feet by 6 feet by 2½ feet, with 6 inch connections. Complete, with seal and all connections.

One purifying box, 10 feet by 10 feet by 3 feet, with all connections.

One 12-pipe condenser, 6½ feet long, 20 inches wide and 10 inches deep, with 6 inch connections. All in first class condition.

Address, MARQUETTE GAS LIGHT CO.,
1454-tf MARQUETTE, MICH.

Apparatus Wanted

FOUR SECOND-HAND PURIFIERS,

Ten feet by 12 feet by 4 feet, with 10 inch connections and seal, complete Parties contemplating a change to larger boxes, adddress,
1455-4 GAS CO. OF WEST CHESTER, Westchester, Pa.

WANTED,

To Lease or Buy

A coal gas works in a town of 10,000 to 20,000 inhabitants. Central or Middle West preferred. Replies strictly confidential.
1454-1 Address, "BUSINESS," care this Journal.

Utilize Your Gas Liquor.

NO EXTRA LABOR OR OPERATING EXPENSES.

IMPROVED AMMONIA CONCENTRATOR.

About 100 in use. Write to

STROH & OSIUS, Patentees, or
MICHIGAN AMMONIA WORKS, - Detroit, Mich.

(*Concluded from page 655.*)

BURNERS.

C. A. Gefrorer, Philadelphia, Pa..... 660
D. M. Steward Mfg. Co., Chattanooga, Tenn..... 660
Wm. M. Crane Co., New York City..... 661

LAVA GAS TIPS.

D. M. Steward Mfg. Co., Chattanooga, Tenn..... 660

STREET LAMPS.

Thos. T. W. Miner, New York City..... 661
Welsbach Street Lighting Co., New York and Phila.... 666

PURIFIERS.

Kerr Murray Mfg. Co., Fort Wayne, Ind..... 672
R. D. Wood & Co., Philadelphia, Pa..... 674
Stacey Mfg. Co., Cincinnati, O..... 675
The Western Gas Construction Co., Fort Wayne, Ind... 640
Connelly Iron Sponge and Governor Co., New York City 660

PURIFYING MATERIALS.

Connelly Iron Sponge and Governor Co., New York City 660

VALVES.

Continental Iron Works, Brooklyn, N. Y..... 674
Isbell-Porter Co., NewYork City..... 674
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 672
Ludlow Valve Manufacturing Co., Troy, N.Y..... 661
R. D. Wood & Co., Philadelphia, Pa..... 674
The P. H. & F. M. Roots Co., Connersville, Ind..... 663
The Western Gas Construction Co., FortWayne, Ind... 640

EXHAUSTERS.

Connelly Iron Sponge and Governor Co., New York City 660
Isbell-Porter Company, New York City..... 674
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 672
The Connersville Blower Company, Connersville, Ind... 673
The P. H. & F. M. Roots Co., Connersville, Ind..... 663

ELECTRICAL APPARATUS.

Wm. Henry White, New York City..... 675

PURIFIER SCREENS.

John Cabot, New York City..... 669

GAS STOVES.

American Meter Co., New York and Philadelphia..... 665
Keystone Meter Co., Royersford, Pa..... 678
Maryland Meter and Manufacturing Co., Baltimore, Md 678
Nathaniel Tufts Meter Co., Boston Mass..... 678

HOT WATER HEATERS.

The Humphrey Mfg. and Plating Co., Kalamazoo, Mich. 664

GASHOLDER TANKS.

J. P. Whittier, Brooklyn, N.Y..... 662

GASHOLDERS.

Bartlett, Hayward & Co., Baltimore, Md..... 675
Continental Iron Works, Brooklyn, N.Y..... 674
Davis & Farnum Mfg. Co., Waltham, Mass..... 672
Deily & Fowler, Philadelphia, Pa..... 676
Kerr Murray Mfg. Co., FortWayne, Ind..... 672
Logan Iron Works, Brooklyn, N Y..... 676
R. D. Wood & Co., Philadelphia, Pa..... 674
Riter-Conley Mfg. Co., Pittsburg, Pa..... 675
Stacey Mfg. Co., Cincinnati, O..... 675

STORAGE TANKS.

Christopher Cunningham, Brooklyn, N.Y..... 669

AUTOMATIC SCALES.

Richardson Scale Co., New York City..... 660

INVESTORS.

W. R. Faben Construction Company, Toledo, O..... 660

PATENTS, TRADE-MARKS, COPYRIGHTS.

Royal E. Burnham, Washington, D. C..... 660

1903. NEW DETROIT 1903.

Force Draft

ARC GAS LAMP,

With double flash pilot. We save 25 per cent. gas over any other arc and produce more candle power. To light consumption what the gas range is to fuel.

A Handsome Fixture. Always in Order.

We will send one or more lamps on 30 days' trial to Gas Companies who maintain the lamps. Write for quotations and circulars. We will save you money.

Detroit Arc Gas Light Company,

67-71 Michigan Avenue, Detroit, Mich.

Bronder Patent Stoking Machinery.

Three-Scoop and Three-Rake Charging and Discharging Machines are operating in New York, Newark, N. J., Philadelphia, Worcester, Mass., Mt. Vernon, N. Y., Toronto and Montreal, Canada.

Four-Scoop and Four-Rake Charging and Discharging Machines are being furnished for Detroit, Mich.

These are the only machines that will draw or charge simultaneously three or four retorts (vertically) and handle from 42 to 60 retorts in from 25 to 30 minutes, lid opening and closing and filling of furnaces included.

Hot Coke Conveyor, Quencher and Steam Exhauster, operating in Toronto, Can., working in water-sealed flue, rollers being protected from heat and grit.

COAL CRUSHERS, CONVEYORS AND BINS. TURNTABLES FOR MACHINES.

Labor-Saving Machines for Handling Coal and Coke from Coal Cars to Coke Yard or Bins, a Specialty.

G. A. BRONDER,

Contracting Engineer and Builder,

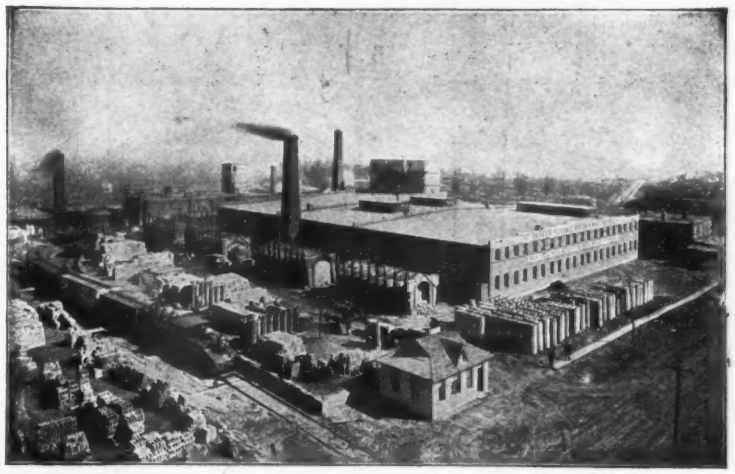
229 BROADWAY, NEW YORK.

PARKER-RUSSELL MINING AND MFG. CO.,

PROPRIETORS OF THE

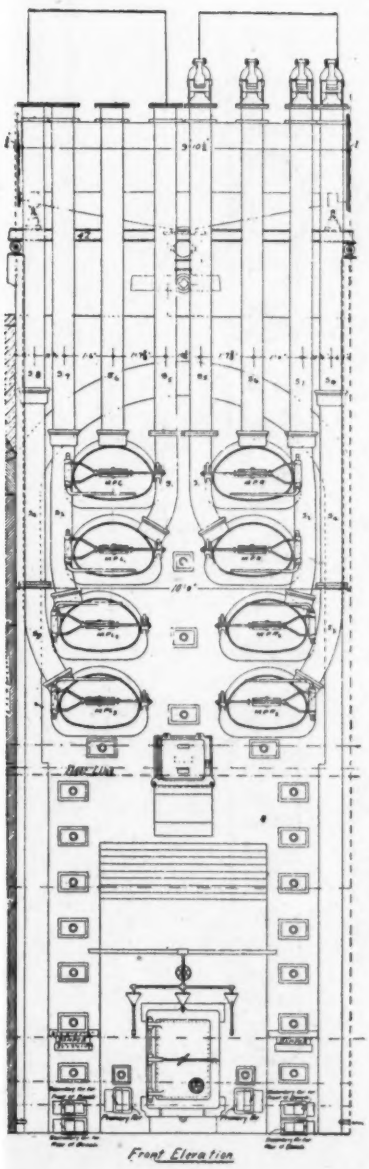
OAKHILL GAS RETORT AND FIREBRICK WORKS.

St. Louis Office:
417 Pine St.



FACTORY AT ST. LOUIS, MO.

New York Office:
Aldrich Court,
45 Broadway.



WE MAKE A SPECIALTY OF WATER GAS LININGS AND CHECKER BRICK.

Half and Full Depth Benches of Our Own Design,

Containing 6, 8 or 9 Retorts.

SLOPERS.--We have perfected plans of INCLINED RETORT BENCHES, designed to meet conditions prevailing in America, and constructed entirely of American materials.

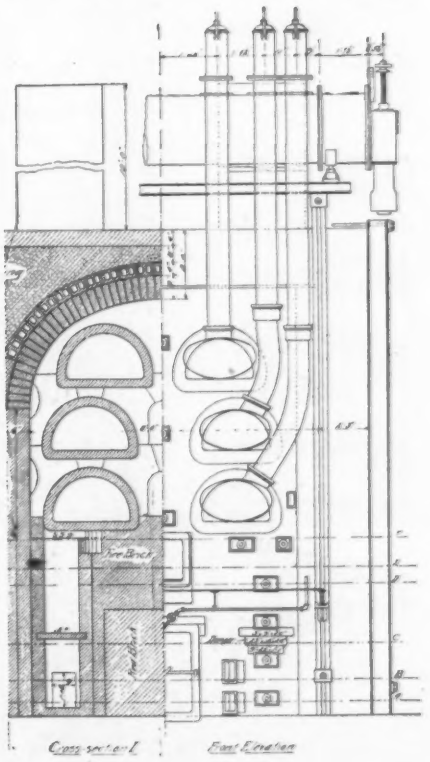
We build Benches complete, ready for gas making. Also

RETORT HOUSES,

COAL AND COKE CONVEYING MACHINERY.

Plans, Specifications and Estimates cheerfully furnished.

CORRESPONDENCE SOLICITED.



ADAM WEBER SONS.

BUILDERS AND CONSTRUCTORS OF THE

"MAURICE GRAHAM" SYSTEM OF

INCLINED RETORT

INSTALLATIONS COMPLETE.

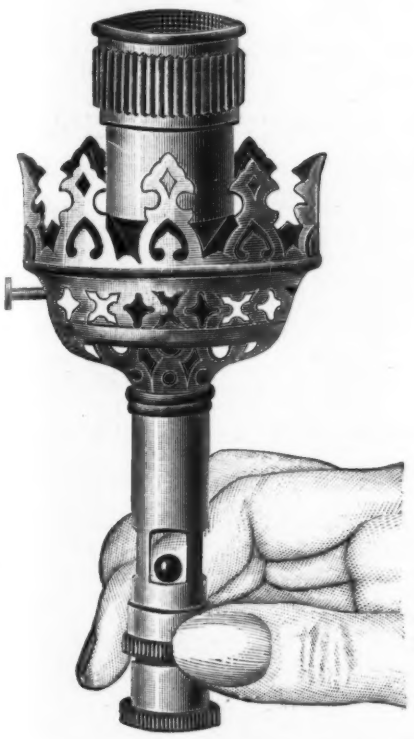
WE HAVE A STAFF OF EXPERIENCED AND TRAINED ENGINEERS TO ERECT THIS SYSTEM.

THE LARGEST INSTALLATIONS IN THE WORLD WITH 20-FOOT RETORTS AND BENCHES OF 9'S IN ACTION. NOW OPERATING AT EDINBOROUGH, LEEDS, MILAN, PARIS, LONDON, ETC.

GRAHAM'S PATENT HOT COKE CONVEYOR.

FOR QUENCHING AND DRYING THE COKE DURING TRANSIT.

See Articles in AMERICAN GAS LIGHT JOURNAL, February 9th and 16th, 1903.



The Ball Check.

Pat. Nov. 25, 1902.

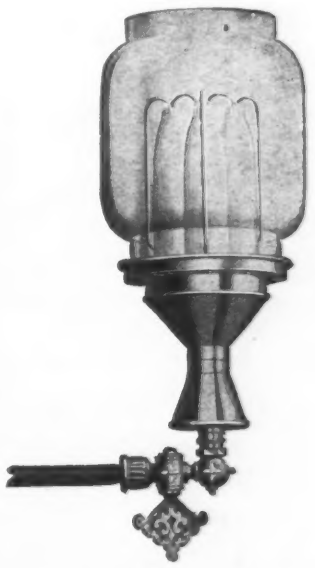
ANY BURNER.

ANY GAS--ANY PRESSURE.
INSTANT ADJUSTMENT.

HIGHEST EFFICIENCY.

"JUST A TWIST OF YOUR WRIST AND YOUR LIGHT IS BRIGHT."

"THE BALL DOES IT ALL."



Triple Arc Ball Check Lamp fits any chandelier or gas bracket. Three times the light of the single mantle burner, yet burns only double the amount of gas. More light—less gas. Greatest illuminator in the world for the money.

Send for the Ball Check Light Booklet.

BALL CHECK LIGHT CO.,
16 AND 18 PARK PLACE,
NEW YORK.

NEW ENGLAND BALL CHECK LIGHT CO.,
161 FRANKLIN STREET,
BOSTON.

FRANK D. MOSES

TRENTON, N. J.,

Constructing Engineer and Contractor.

Estimates Furnished on any kind of Work in Connection with Gas or Water Plants.

SPECIAL ATTENTION GIVEN TO THE REMODELLING AND EXTENDING OF THE PROPERTIES OF WORKS NOT UP-TO-DATE.

CORRESPONDENCE SOLICITED.

P. PLANTINGA, President. W. E. STEINWEDELL, Secretary.

THE GAS MACHINERY CO.,

OFFICES: 720-722 CITIZENS BUILDING,

CLEVELAND, OHIO.

Coal and Water Gas Apparatus, Bye-Product Machinery, Structural Work and Connections.

See Articles in AMERICAN GAS LIGHT JOURNAL, FEBRUARY 16, 1903.

STEWARD LAVA TIPS.

ALL SIZES. ALL KINDS.

Greatest care is used in selection of material and making.

YOU CAN GET ANY QUANTITY PROMPTLY FROM OUR THREE BRANCHES.

THE D. M. STEWARD MFG. CO., (ESTABLISHED 1876.

NEW YORK: 107 CHAMBERS STREET. CHICAGO: 57 WASHINGTON STREET. FACTORY AND GENERAL OFFICE: CHATTANOOGA, TENN.

Gas Analyses of All Sorts and Conditions,

—OR—

Analyses of Solid and Liquid Materials as Well,

That are needed by Gas Companies at any time in the conduct of their business, may be obtained from

DR. W. H. BIRCHMORE,

1421-tf 341 ADELPHI ST., BROOKLYN, N. Y.

IN THE MARKET.

WE PURCHASE:

Gas properties,
Electric light properties.
Street railway properties.
Also desirable franchises.

W. R. FABEN CONSTRUCTION CO.,

1383-tf 317 St. Claire Street, Toledo, O.

PATENTS, TRADE-MARKS, COPYRIGHTS.

ROYAL E. BURNHAM,

Solicitor of Patents and Counsellor in Patent Causes.

833 Bond Building, Washington, D. C.

Send for Pamphlet on Patents.

1418-tf

AUTOMATIC SCALES

Send for Catalogue.

RICHARDSON SCALE CO., 21 Park Row, NEW YORK CITY.

GAS BURNERS,

To burn a given amount at a stated pressure, made to order. Samples furnished. Also, small oil and air valves, slow-feed valves for high pressure, and small brasswork in general.

Drip Pumps, Service Cleaners, Gasfitters' Proving Pumps and Mercury Gauges.

C. GEFRORER & SON,

248 North 8th Street, Philadelphia, Pa.

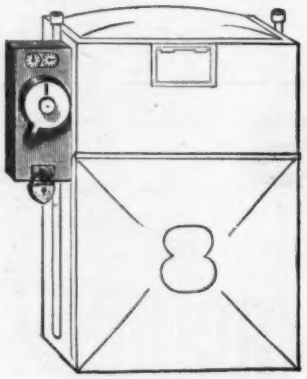
HUGHES' "GAS WORKS,"

Their Construction and Arrangement, and the Distribution of Coal Gas.

Originally written by SAM'L HUGHES, C.E. Rewritten and much enlarged by WM. RICHARDS, C.E.

Eighth Edition. Revised, with Notices of Recent Improvements. Price, $1.65.

A. M. CALLENDER & CO., 42 PINE ST., N. Y. CITY.



THE **REEVES PREPAYMENT ATTACHMENT**

HAS ADVANTAGES POSSESSED BY NO OTHER DEVICE OF THE KIND.

FATAL ACCIDENTS CAUSED BY CANNOT OCCUR

CONSUMERS PUTTING COIN IN METER AND SO TURNING GAS ON IN SLEEPING ROOMS WHERE IT HAD GONE OUT WITH THE **REEVES,** AS THE LIGHT DROPS TO A VERY SMALL ONE, BUT DOES NOT GO OUT FOR 10 OR MORE HOURS, AND AMOUNT OF GAS SO USED IS AUTOMATICALLY DEDUCTED FROM NEXT PREPAY. HAS OTHER GREAT ADVANTAGES. FITTED TO ANY MAKE OF METER. $10 CAN BE PREPAID AT ONE TIME. DEVICE CANNOT BE "BEATEN."

REEVES MFG. CO., - - - NEW HAVEN, CONN.

FRED. BREDEL, President. WM. O. WILTER, Vice-President. O. W. GREENSLADE, Secretary and Treasurer.

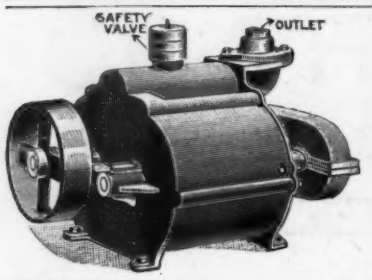
FRED. BREDEL COMPANY,

ENGINEERS AND BUILDERS OF GAS PLANTS.

Inclined Benches, own system, Recuperative Furnaces, Exhausters, Exhauster Governors, Condensers, Washers, Coolers, Wet Purifying Plants, Purifiers, Oxide Elevators, Hydraulic and Dry Coke Conveyors.

Special High Grade Material for Recuperative Furnaces.

Licensees for ARROLL-FOULIS Charging and Discharging Machines and FRONHAUSER Coke Conveyors. OFFICE, 405 KEENE ST., MILWAUKEE, WIS.



REVIVIFYING IN SITU.

An inexpensive device for admitting air into purifying boxes. Belted direct to exhauster shaft the speed of blower is automatically regulated. Size shown in cut, 10″ x 10½″ x 16″, has a capacity of 172 cubic inches per revolution, and can be speeded to admit any percentage of air desired. Specially designed for gas companies.

A large number of these machines are now in daily use, giving entire satisfaction.

Correspondence Solicited.

CONNELLY IRON SPONGE AND GOVERNOR CO.,

395 Broadway, New York.

PRACTICAL HANDBOOK ON GAS ENGINES, WITH INSTRUCTIONS FOR CARE AND WORKING OF THE SAME,

By G. LIECKFELD, C.E. Translated with Permission of the Author, by GEO. M. RICHMOND, M.E. Price, $1.00.

A. M. CALLENDER & CO., 42 PINE ST., NEW YORK CITY.

Have you seen BRAY'S

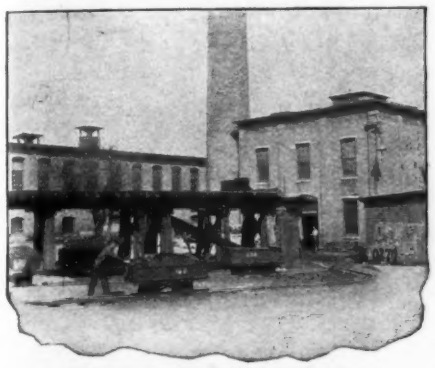
New "ELTA" Burners?

These are the only Acetylene Burners which can be turned high or low without carbonizing, and, therefore, they remove one of the greatest barriers to the progress of lighting by Acetylene. Write for further information.

WILLIAM M. CRANE COMPANY,

SOLE AGENTS FOR THE UNITED STATES,

1131 Broadway, New York.



Boiler room charging cars and tracks.

Write for Catalog 0227.

"Industrial"

(Trade-mark)

Railways

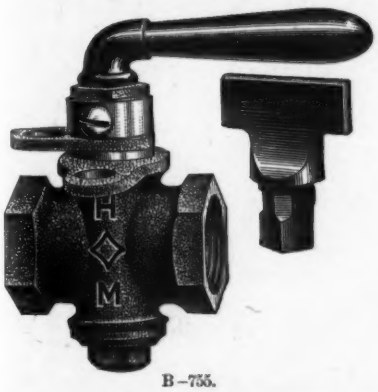
For the economical and rapid handling of coal in boiler rooms. A narrow gauge railway, equipped with cars, designed so that they run around a curve of 12 feet radius as easily as a wagon turns a corner.

C. W. HUNT COMPANY,

WEST NEW BRIGHTON, STATEN ISLAND, N. Y.

New York Office: 45 Broadway.

Mueller Gas Cocks.



B-755.

TOO little is not as much as you pay for, and too much is more paid for than you need.

In **Mueller Gas Cocks** you find a happy medium--not so little metal as to leave them weak, nor yet so much as to make them costly.

Made in 145 styles, seven sizes in each style.

MADE ONLY BY

H. MUELLER MFG. CO.,

DECATUR, ILLS., U. S. A.

THE

Ludlow Valve Mfg. Co.,

TROY, N. Y., U. S. A.

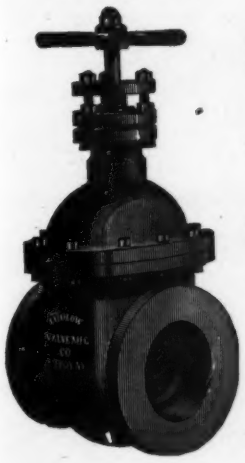
Double and Single Gate Valves, ¼" to 72",

—FOR—

Gas, Water, Steam, Oil, Ammonia, Etc.

HOT GAS VALVES A SPECIALTY.

Send for Catalogue.



"THE MINER"

Globe Street and Boulevard Lamps.

Cheapest and Best.

THOUSANDS IN USE WITH INCANDESCENT BURNERS.

Send for Catalogues.

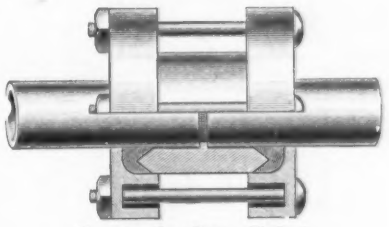
THOMAS T. W. MINER,

821-823 Eagle Av., N.Y.

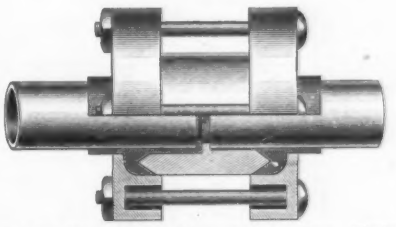
S. R. DRESSER,

BRADFORD, PENNSYLVANIA, U. S. A.,

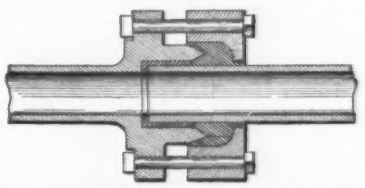
Patentee and Manufacturer of Specialties for Oil and Gas Lines.



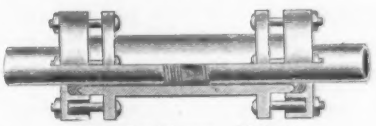
Regular Coupling. Style 1.



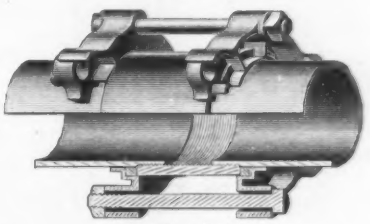
Insulating Coupling for Wrought Iron Pipe. Style 5.



Insulating Coupling for Bell and Spigot Cast Iron Pipe. Style 6.



Regular Sleeve. Style 2.



Clamp. Style 4.

Pipe Couplings, Sleeves, Clamps, Crosses, Tees and Ells.

My Insulating Coupling prevents the destruction of pipe by electrolytic action, in either water or gas lines.

SEND FOR CATALOGUE.

LLOYD CONSTRUCTION COMPANY,

DETROIT, MICH.

LOWE DOUBLE SUPERHEATER WATER GAS APPARATUS.

Coal Gas Condensing and Scrubbing Apparatus.
Purifiers with Plain or Reversing Center Valves.
The Lloyd System of Valve Connections.
PLAIN OR REVERSING (PATENT APPLIED FOR).
Oxide, Coal and Coke Elevators and Machinery.
Pipe Specials, all sizes. A. G. L. Asn. Standard.
Structural Steel Work, Floors, Angle and Gate Valves.

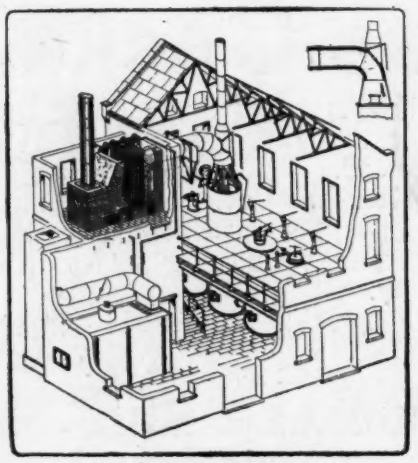
General Western Agents for BARTLETT, HAYWARD & CO., Baltimore, Md.

COAL GAS CONDENSATION SYSTEM. THE "MAYER" PATENTED TAR EXTRACTOR. THE STANDARD ROTARY WASHER-SCRUBBER. STETTIN SYSTEM INCLINED BENCHES, HYDRAULIC VALVES, ETC., ETC.

Economize Heat in Water Gas Plants,

BY UTILIZING A

Green's Economizer,



To absorb the heat now going to waste when you blow through your superheater to heat the feed water for your boilers to the temperature of the steam. This is now being done at the Poughkeepsie Gas Works, Poughkeepsie, N. Y. : : : : :

Write for full particulars how this is accomplished, the saving effected, and the advantages gained, to the

GREEN FUEL ECONOMIZER CO.,

MATTEAWAN, N. Y.

GASHOLDER TANKS AND GAS WORKS MASONRY COMPLETE

Plans prepared and Estimates furnished at short notice.

J. P. WHITTIER,

238 Java Street, Brooklyn, N. Y.

GEORGE R. ROWLAND,

Formerly with the Continental Iron Works.

Draughtsman and Constructing Engineer.

Drawings, Specifications and Estimates furnished for the construction of new works or alteration of old works. Special attention given to Patent Office drawings.

Office, No. 245 Broadway, N. Y. City.

Chollar's System of Gas Purification.

THE PURIFIED GAS REVIVES THE FOULED OXIDE.

THE GAS ENGINEERS' POCKET-BOOK.

By Henry O'Connor,

Comprising Tables, Notes and Memoranda relating to the Manufacture, Distribution and Use of Coal Gas, and the Construction of Gas Works.

PRICE, $3.50.

A. M. CALLENDER & CO., No. 42 Pine Street, New York City.

The Advertisement of the

CONNELLY IRON SPONGE AND GOVERNOR COMPANY,

395 Broadway, New York City,

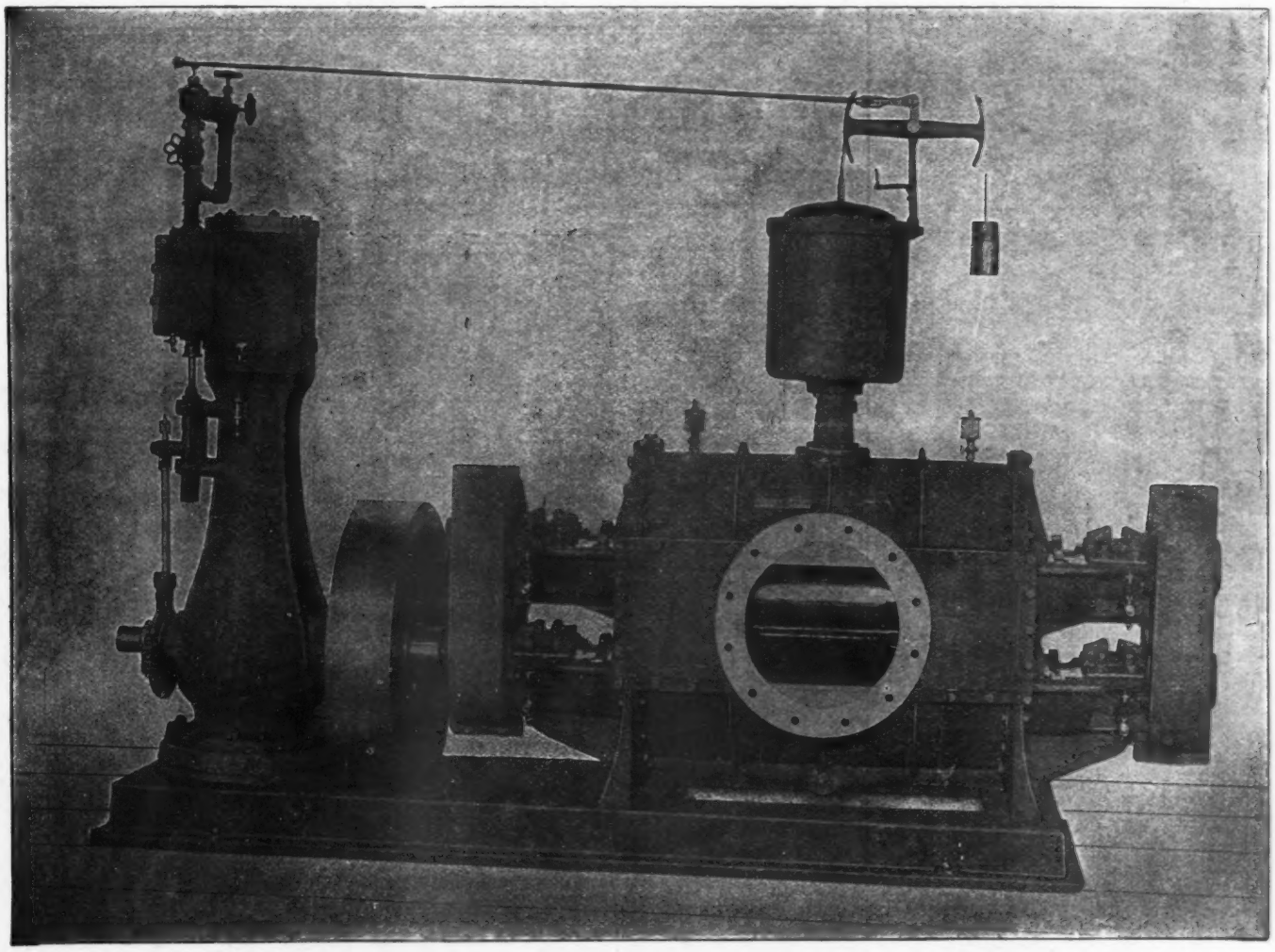
Occupies this Space Every Alternate Week.

ROOTS'

NEW GAS EXHAUSTER.

Always in the lead. Always anticipating the requirements of the trade. Our new Exhauster meets all demands of modern gas making and overcomes all difficulties heretofore experienced.

OUR GAS GOVERNOR IS MAKING FRIENDS EVERY DAY.



P. H. & F. M. ROOTS CO.,

Connersville, Ind. 109 Liberty St., New York.

Eastern Office:

CONNELLY IRON SPONGE AND GOVERNOR CO., 395 BROADWAY, NEW YORK CITY.

"GLOBE" SPECIALS, VALVES, ETC. "GLAMORGAN" PIPE FITTINGS

M. J. DRUMMOND & CO.

MANUFACTURERS OF CAST IRON

FLANGE GAS AND WATER PIPE

GENERAL SALES OFFICE, 192 BROADWAY, NEW YORK.

GEORGE ORMROD, Mangr. & Treas., Emaus, Pa.
JOHN DONALDSON, Prest., Betz Bldg., Phila., Pa.

EMAUS PIPE FOUNDRY.

DONALDSON IRON COMPANY. EMAUS, PA.

CAST IRON GAS & WATER PIPE

MANUFACTURERS OF

CAST IRON PIPE AND SPECIAL CASTINGS

FOR WATER AND GAS.

Also, FLANGE PIPE, LAMP POSTS, Etc.

GAS TAPPING MACHINES

—FOR—

Drilling and Tapping Pipe under Pressure

WITHOUT ANY ESCAPE OF GAS.

They are Strong and Compact.

Size of Combination Drills and Taps ¾ to 4-inch.

Machines Sent to any Gas Company for Thirty Days' Trial.

Send for Circulars.

Geo. Light,

DAYTON, O.

THE ECONOMICAL GAS APPARATUS CONSTRUCTION COMPANY, LIMITED,

Consulting Engineers.

Builders of UP-TO-DATE Machinery and Appliances for Coal and Water Gas Plants. :: :: :: :: ::

PLANS, SPECIFICATIONS AND ESTIMATES PREPARED.

AMERICAN OFFICE:
269 Front St., East, Toronto, Canada.

THE

Valuation of Gas, Electricity and Water Works

FOR ASSESSMENT PURPOSES.

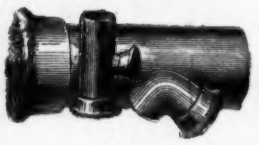
THOS. NEWBIGGING, M.Inst.C.E., and WM. NEWBIGGING, Assoc.M.Inst.C.E.

With an Appendix of Decided Cases.

Second Edition. Price $2. For Sale by

A. M. CALLENDER & CO.,
42 Pine Street, N. Y. City.

WARREN FOUNDRY AND MACHINE CO.,



Established 1856. Works at Phillipsburgh, N. J.

New York Office, 160 Broadway.

CAST IRON WATER AND GAS PIPE,

FROM THREE TO FORTY-EIGHT INCHES DIAMETER. ALSO, ALL SIZES OF

Flange Pipe for Sugar House and Mine Work. Branches, Bends, Retorts, etc., etc.

CHARLES MILLAR & SON CO., Selling Agents, Utica, N.Y.

Flanged Pipe and Fittings, Hydrants, Gates, Pig Lead, Jute, etc.

UTICA PIPE FOUNDRY CO.

Manufacturers of Lead Pipe, Solder, etc., and Jobbers of Plumbers' and Tinners' Goods.

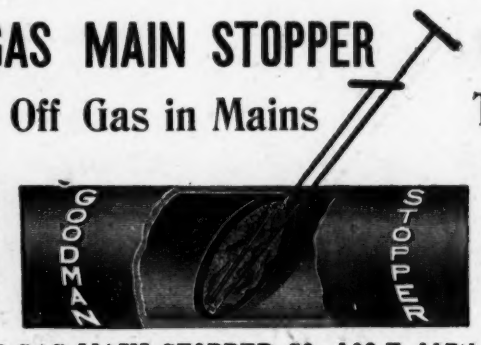
CAST IRON PIPE and SPECIALS FOR WATER AND GAS

Wholesale Eastern Agents AKRON VITRIFIED SEWER PIPE.

SAFETY GAS MAIN STOPPER COMPANY,

For Shutting Off Gas in Mains

Any size gas main can be shut off in 30 seconds. : : :



Temporarily during alterations and repairs. : : : :

STOPPERS SENT ON TRIAL.

Address: SAFETY GAS MAIN STOPPER CO., 108 E. 117th St., New York City.

THE No. 8

Humphrey Crescent Instantaneous Water Heater

IS A QUICK SELLER.

PRICE,

$20.00.

SHELF AND BRACKET FREE.

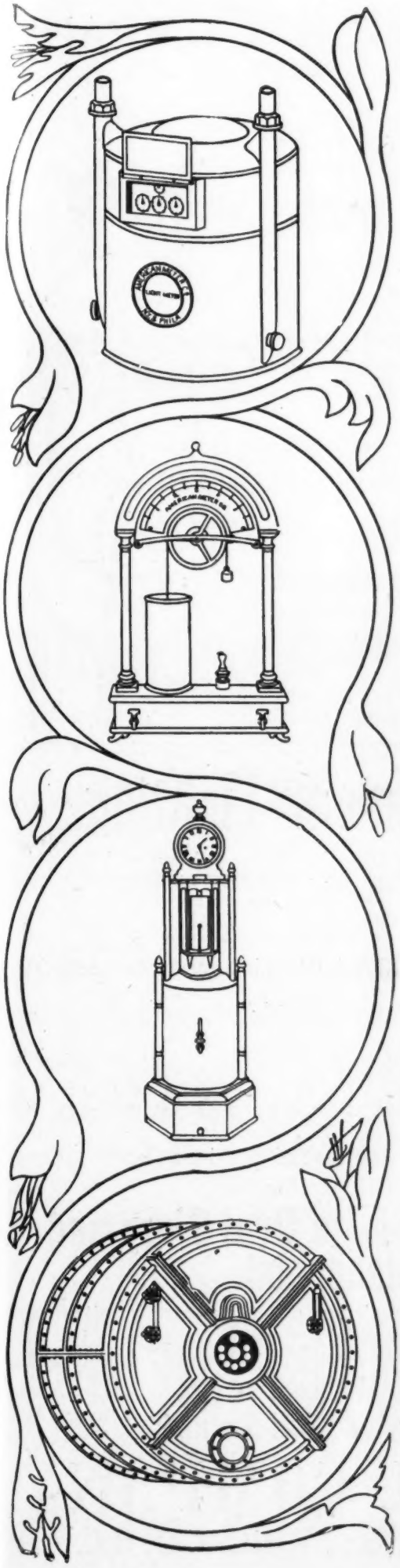
HAS NO EQUAL AT THE PRICE.

TRY ONE AND BE CONVINCED. WILL SEND ON 60 DAYS' APPROVAL.

HAVE YOU OUR CATALOGUE?

The Humphrey Mfg. and Plating Co.,

KALAMAZOO, MICH., U. S. A.



(Copyrighted, 1894, by the AMERICAN METER CO.)

AMERICAN METER CO.

ESTABLISHED 1834. INCORPORATED 1883.

NEW YORK,
PHILADELPHIA,
CHICAGO,
ST. LOUIS,
SAN FRANCISCO.

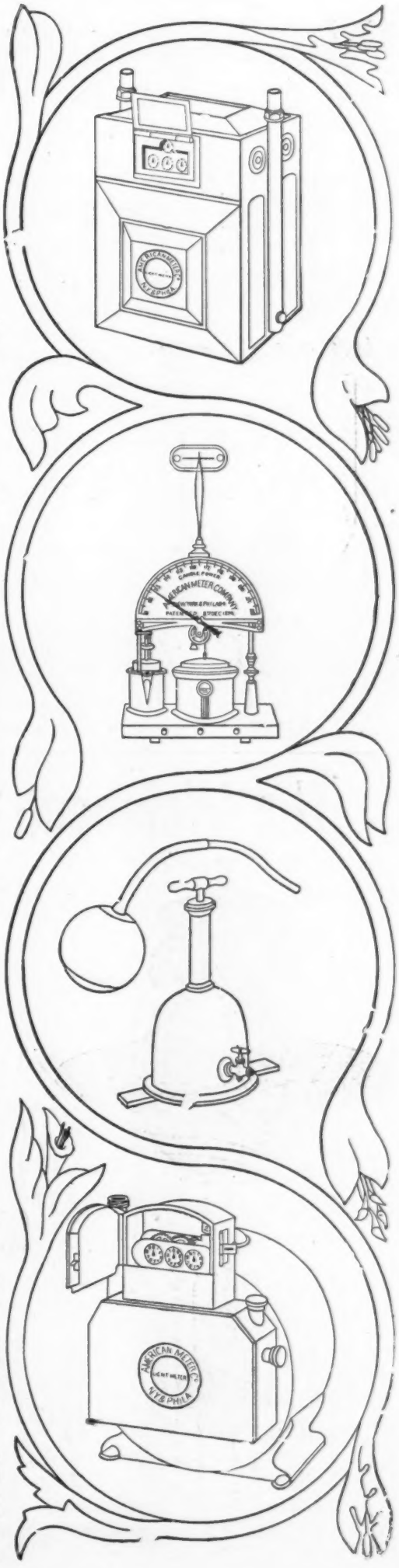
PUBLIC LIGHTING TABLE.

MAY, 1903.

Day of Week.	Date.	Table No. 1. Following the Moon. Light.	Extinguish.	Table No. 2. New York City. All Night Lighting. Light.	Extinguish.
				P.M.	A.M.
Fri.	1	7.20 PM	4.10 AM	6.45	4.00
Sat.	2	11.10	4.10	6.45	4.00
Sun.	3	11.50 FQ	4.00	6.45	4.00
Mon.	4	12.30 AM	4.00	6.45	4.00
Tue.	5	1.10	4.00	6.45	4.00
Wed.	6	1.40	4.00	6.45	4.00
Thu.	7	2.10	4.00	6.55	3.40
Fri.	8	2.50	4.00	6.55	3.40
Sat.	9	3.20	4.00	6.55	3.40
Sun.	10	No L.	No L.	6.55	3.40
Mon.	11	No L. FM	No L.	6.55	3.40
Tue.	12	No L.	No L.	6.55	3.40
Wed.	13	7.30 PM	10.00 PM	6.55	3.40
Thu.	14	7.30	10.50	7.00	3.30
Fri.	15	7.30	11.40	7.00	3.30
Sat.	16	7.30	12.10 AM	7.00	3.30
Sun.	17	7.40	12.50	7.00	3.30
Mon.	18	7.40	1.20	7.00	3.30
Tue.	19	7.40 LQ	2.00	7.00	3.30
Wed.	20	7.40	2.30	7.00	3.30
Thu.	21	7.40	3.00	7.10	3.15
Fri.	22	7.40	3.30	7.10	3.15
Sat.	23	7.40	3.40	7.10	3.15
Sun.	24	7.50	3.40	7.10	3.15
Mon.	25	7.50	3.40	7.10	3.15
Tue.	26	7.50 NM	3.40	7.10	3.15
Wed.	27	7.50	3.40	7.10	3.15
Thu.	28	7.50	3.40	7.15	3.15
Fri.	29	7.50	3.40	7.15	3.15
Sat.	30	7.50	3.40	7.15	3.15
Sun.	31	10.30	3.30	7.15	3.15

TOTAL HOURS LIGHTING DURING 1903.

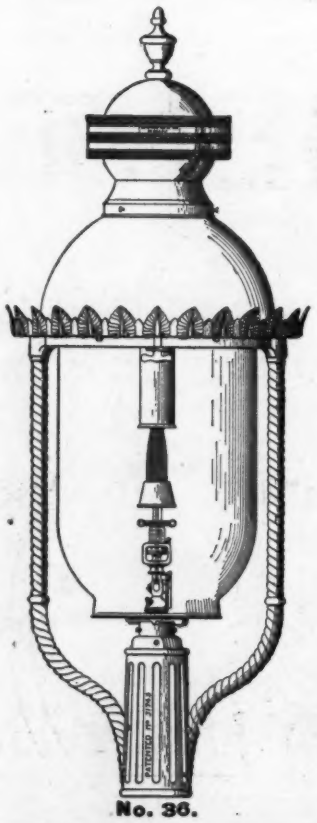
By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	245.00	January	423.20
February	192.00	February	355.25
March	201.00	March	355.35
April	167.20	April	298.50
May	152.00	May	264.50
June	131.00	June	234.25
July	140.40	July	243.45
August	156.20	August	280.25
September	171.20	September	321.15
October	198.20	October	374.30
November	216.30	November	401.40
December	232.10	December	433.45
Total, yr.	2203.40	Total, yr.	3987.45



NEW YORK, 33 Nassau Street. PHILADELPHIA, Broad and Arch Streets. CHICAGO, Foot of Orleans Street. BOSTON, 624 Tremont Building.
CLEVELAND, 809 Cuyahoga Building. ST. LOUIS, 712 Roe Building. SAN FRANCISCO, 712 Polk Street.

WELSBACH STREET LIGHTING COMPANY

.... OF AMERICA ....



No. 36.

Controls and Operates the

Welsbach System of Street Lighting,

Which includes its specially DESIGNED AND PATENTED BURNER for STREET and PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

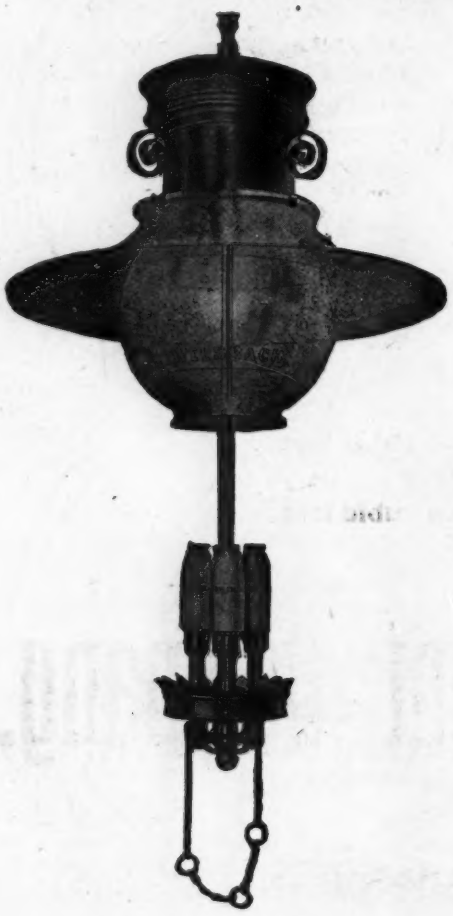
IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others Interested in Municipal and Outside Lighting.

No. 38.

The Welsbach Gas Arc for Indoor Lighting.



The cut tells the story—but not all of it. Get one lamp and light it—then the tale's told from beginning to end. For one Welsbach Gas Arc Lamp is a better salesman than 20 pages of advertising.

Here's what it would show if you give it a chance to prove its worth:

1. A mechanical construction and finish that insures the greatest durability.
2. The renewal of mantles and the cleaning of globes without removal of globe.
3. The greatest amount of candle power with least consumption of gas.
4. A by-pass cock so constructed as to permit all or only one mantle burning at a time.
5. A pilot light that consumes but 1 foot of gas in 24 hours. Costs $\frac{1}{10}$ of a cent a day.

Give it a Chance to Tell its Own Story and it Won't Disappoint.

Let us send you one lamp—doesn't cost a fortune—and it will answer every question you put to it; make good on every test given it. You know the only proof of the pudding? What's the use in a fellow telling you it tastes good? Taste it yourself, then you know.

May we Send you ONE Lamp?

WELSBACH COMPANY,

GLOUCESTER, N. J., and CHICAGO, ILL.

THE UNITED GAS IMPROVEMENT COMPANY

During the Year 1902 has been Awarded Contracts in the Following Places for

Standard Double-Superheater Lowe Water Gas Apparatus.

Atlantic City, N. J.	Flushing, N. Y.	Norristown, Pa.
Ardmore, Pa.	Hollidaysburg, Pa.	Norwalk, O.
Auburn, N. Y.	Houston, Tex.	Ocean City, N. J.
Belmar, N. J.	Indianapolis, Ind.	Oklahoma City, O. T.
Blue Island, Ills.	Jersey City, N. J.	Oneonta, N. Y.
Boonton, N. J.	Laconia, N. H.	Plainfield, N. J.
Brooklyn, N. Y.	Lakewood, N. J.	Portland, Me.
Carlisle, Pa.	La-Salle-Peru, Ills.	Pottsville, Pa.
Champaign, Ills.	Martinsville, Ind.	Scranton, Pa.
Coney Island, N. Y.	Memphis, Tenn.	South Brooklyn, N. Y.
Dallas, Tex.	Newark, N. J.	Suffern, N. Y.
Danville, Ills.	New Brunswick, N. J.	Swedesboro, N. J.
Des Moines, Ia.	New London, Conn.	Syracuse, N. Y.
Evanston, Ills.	New Orleans, La.	Washington, N. C.
Evansville, Ind.	Norfolk, Va.	Woonsocket, R. I.

TOTAL SETS, 1902, ... 51
TOTAL DAILY CAPACITY, 1902, . . 32,825,000 cubic feet.
TOTAL SETS TO DATE, ... 447
TOTAL DAILY CAPACITY, ... 299,670,000 cubic feet.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

Established 1858. Incorporated 1890.
CHAS. E. GREGORY, Prest. DAVID R. DALY, V.-Prest. & Treas.
H. D. ABERNETHY, Sec.

J. H. Gautier & Co.

Greene & Essex Streets,
Jersey City, N. J.

MANUFACTURERS OF

CLAY GAS RETORTS, FIRE CLAY TILES,
FIRE BRICK and FIRE CLAY SPECIALTIES

Ground Fire Clay, Fire Sand and Ground Fire Brick in Barrels and Bulk.

SOLE MANUFACTURERS OF THE

FLEMMING GENERATOR GAS FURNACE

Brooklyn Fire Brick Works,

OFFICE AND WORKS:
88 VAN DYKE ST., BROOKLYN, N. Y.
MANUFACTURERS OF

CLAY GAS RETORTS & SETTINGS, GENERATOR LININGS. SPECIALTIES.

Established 1854. Incorporated 1869.

LACLEDE
Fire Brick Manufg. Co.,

Manufacturers of { GAS RETORTS . .
FIRE BRICK . . .
RETORT SETTINGS

Water Gas Cupola Linings, Fire Clay, Etc.

Proprietors for the U. S., Coze System of Inclined Benches.

Estimates Furnished on Application for Most Successful Style of Construction.

Also for Free-Firing and Full and Half-Depth Regenerative Benches, for Burning either Coal or Coke in the Furnaces.

Office:
Cor. Manchester and Sulphur Avenues, St. Louis, Mo.

Established 1845. Reorganized 1902.

The Kreischer Brick Mfg. Co.,

Manufacturers of the very best quality of Clay Retorts, Blocks, Tiles, Settings and Firebrick of every description.

Also Miners and Shippers of Fireclay, Fire Sand, Ground Brick in Barrels.

WORKS: KREISCHERVILLE, STATEN ISLAND.
OFFICE: 119 E. 23D STREET, NEW YORK CITY.

Adam Weber Sons.

Works, Weber, N. J.
Main Offices, Park Row Bldg., New York.

Modern Recuperative Furnaces.

Standard Fire Brick and Gas Retorts.

OSCAR B. WEBER'S

Construction Vertical 8's (Patented). First Instalment in the World with Modern Charging and Discharging Machinery.

AGENTS FOR

GRAHAM, MORTON & CO.,
LEEDS ENGLAND,
INCLINED RETORT SYSTEM.

Perforated Radial Block Chimneys.

AGENCIES.
HERBERT B. HAM, 80 Water Street, Boston, Mass.
BAKER ENGINE AND MACHINE CO., 114 N. 3d St., Phila., Pa.
JOHN T. WHEELER, 933-934 Monadnock Bldg., Chicago, Ills.

ISAAC C. BAXTER, President. ESTABLISHED 1864. PETER YOUNG, Sec'y and Treas.

Works,
LOCKPORT STATION, PA.

JAMES GARDNER, JR., CO.,

Address all communications to
JAMES GARDNER, JR., CO., Room 202 Lewis B'l'dg.
PITTSBURGH, PA.

Successor to WILLIAM GARDNER & SON.

Fire Clay Goods for Gas Works.

HENRY MAURER & SON,

(ESTABLISHED 1856.)

EXCELSIOR FIRE BRICK & CLAY

RETORT WORKS

WORKS, Perth Amboy, N. J.
OFFICE, 418 to 422 East 23d St., N. Y.

Clay Gas Retorts,
BENCH SETTINGS,
Fire Brick, Tiles, Etc.

GEROULD'S IMPROVED RETORT CEMENT

A Cement of great value for patching retorts, putting on mouthpieces, making up all bench-work joints, lining blast furnaces and cupolas. This cement is mixed ready for use. Economic and thorough in its work. Fully warranted to stick.

Price List, f.o.b. Galesburg, Ills., or Buffalo, N. Y.
In Casks, 400 to 800 pounds, at 5 cents per pound.
In Kegs, 100 to 200 " " 6 " "
In Kegs less than 100 " " 7 " "

C. L. GEROULD, Galesburg, Ills.

For orders East of Buffalo, N. Y., or Pittsburg, Pa., freight will be paid to these points.

The Gas Engineer's Pocket-Book,

By HENRY O'CONNOR.

Comprising Tables, Notes and Memoranda relating to the Manufacture, Distribution and Use of Coal Gas, and the Construction of Gas Works.

PRICE, $3.50.

For Sale by

A. M. CALLENDER & CO., 42 Pine Street, New York City.

THEO. J. SMITH, Prest. J. A. TAYLOR, Sec.
A. LAMBLA, Vice-Prest. and Supt.

BALTIMORE
RETORT & FIRE BRICK CO.

MANUFACTORY AT
LOCUST POINT, BALTIMORE, MD.

Clay Retorts, Blocks & Tiles

FIRE BRICK, FIRE CLAY, AND FIRE CEMENT.

Our Improved Half and Full Dept Benches have been Adopted by Many Gas Companies.

WALDO BROS., 102 MILK ST., BOSTON, MASS.

Sole Agents for New England States.

JOHN DELL,
President and General Manager.

MISSOURI FIRE BRICK CO.,

ESTABLISHED 1882.

MANUFACTURERS OF

Gas Retorts, Bench Settings, Fire Brick, Cupola Linings, Etc.

We are the **Exclusive Agents** *for the* **Mitchell Patent Benches,** *Constructed with Half or Full Depth Furnaces, to Burn either Coal or Coke, and Arranged for Front or* **Rear Clinkering.** *The* **Mitchell** *is the* **Original Coal Firing Bench.** *We also Erect Plain Benches with* **One** *to* **Six Retorts.**

YOUR CORRESPONDENCE IS RESPECTFULLY SOLICITED.

City Office:
411 Olive Street,
Continental Bank,
ST. LOUIS, MO.

CHRISTOPHER CUNNINGHAM,

PROPRIETOR,

THE NOVELTY STEAM BOILER WORKS,

BROOKLYN, N. Y.

STORAGE TANKS FOR GAS WORKS,

To Retain Fluid Material of Any Sort.

PIPING IN AND AROUND GAS WORKS.

Work Done for Several of the Largest Gas Companies in America Stands as Reference.

Purifier Trays.

¶ We make the strongest and cheapest Trays now on the market. Bolted and Church's Patent Trays, for lime or iron sponge. Write for booklet.

John Cabot,
553-557 West Thirty-third St.,
NEW YORK CITY.

Bristol's Recording
PRESSURE GAUGE.
For continuous records of
Street Gas Pressure.
Simple in construction, accurate in operation and low in price.
Fully Guaranteed. Send for Circulars.

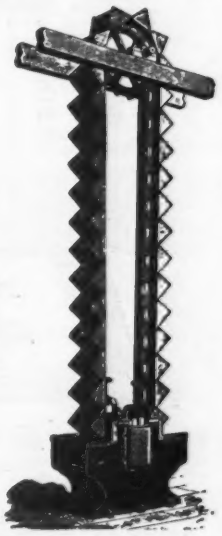
THE BRISTOL CO.,
Waterbury, Conn.

Silver Medal, Paris Exposition.

SEND FOR CATALOGUE.

ADDRESS,
The Jeffrey Mfg. Co.,
Columbus, O.
New York,
Chicago,
St. Louis,
Denver,
Buffalo,
Philadelphia,
Kansas City, Mo.

TYPES OF



JEFFREY
ELEVATORS AND CONVEYORS.

The Gas Engineer's Laboratory Handbook,

By JOHN HORNBY, F.I.C. Price, $2.50.

Orders may be sent to

A. M. CALLENDER & CO., 42 Pine St., N. Y.

JAMES D. PERKINS, President. F. SEAVERNS, Treasurer.

THE PERKINS COMPANY,

228 and 229 Produce Exchange, New York City.

TIDEWATER SALES AGENTS FOR THE FOLLOWING:

Ocean Mine Youghiogheny Gas Coal,
Old Kentucky Shale and O. K. Boghead.

SHIPMENTS FROM NEW YORK. PHILADELPHIA, BALTIMORE AND NORFOLK

BERWIND-WHITE COAL MINING COMPANY'S

Ocean Westmoreland Gas Coal.

Offices:
Washington Building, New York.
Betz Building, Philadelphia.

STRICTLY High Grade. . . . .
Carefully Prepared.
For Gas Making or
Heavy Steaming.

A. C. M. AZOY, General Agent, 1 Broadway, New York.

Gulf Refining Company

REFINERS OF

TEXAS PETROLEUM

HIGH GRADE
GAS OIL
A SPECIALTY

REFINERIES AT
PORT ARTHUR, TEX

GENERAL OFFICES
FRICK BUILDING
PITTSBURG, PA

KELLER ADJUSTABLE COKE CRUSHER.

Strong, Simple, Durable. Will Crush any Size Desired.

C. M. KELLER,
Sec. & Supt. Gas Lt. & Coke Co.,
Columbus, Ind.
Correspondence Solicited.

Do You Wish to Know

what size of pipe to use to convey any quantity of gas, any distance, with any loss of pressure and any initial or final pressure? Then use

Cox's Gas Flow Computer,

as it gives this information accurately at sight, without mental effort. No calculations needed. Saves time, money and mistakes.

Price, 6.5 x 8 inches, in cloth case, $2.50. For sale by

A. M. Callender & Co., 42 Pine St., N. Y.

POOLE ON FUELS.

THE CALORIFIC POWER OF FUELS.

By HERMAN POOLE, F.C.S.

Second Edition. Price, $3. For Sale by

A. M. CALLENDER & CO., 42 PINE ST., N.Y. CITY.

BINDER for the JOURNAL.

Price, $1.00.

A. M. CALLENDER & CO., 42 Pine Street, N.Y.

EDMUND H. McCULLOUGH, President. CHAS. F. GODSHALL, Treasurer. H. C. ADAMS, Secretary. HENRY WHARTON, Assistant Secretary.

THE WESTMORELAND COAL CO.

Chartered 1854.

Mines situated on the Pennsylvania and the Baltimore and Ohio Railroads, in Westmoreland County, Pa.

POINTS OF SHIPMENT:

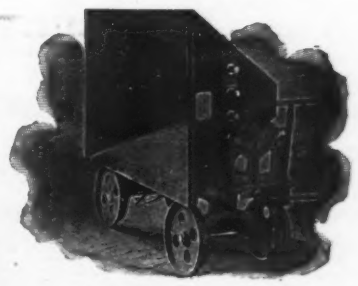
PHILADELPHIA, BALTIMORE, SOUTH AMBOY, N. J.,
WATKINS (SENECA LAKE), N. Y.

Since the commencement of operations by this Company its well-known Coal has been largely used by the Gas Companies of New England and the Middle States, and its character is established as having no superior in gas-giving qualities, and in freedom from sulphur and other impurities.

Principal Office, 224 South 3d St., Phila., Pa.

THE LINK-BELT MACHINERY CO.,

ENGINEERS, FOUNDERS, MACHINISTS,
Chicago, U. S. A.



Tilting Coal and Coke Car.

LINK-BELT ELEVATING & CONVEYING MACHINERY for HANDLING COAL, COKE, OXIDE, ETC.

Tilting Coal and Coke Cars, Breaker Rolls, Power Transmitting Machinery.

Machinery designed and erected to suit existing conditions and available space.

Special Catalogue No. 31 Sent upon Application.

PHILADELPHIA, LINK-BELT ENGINEERING CO.

THE SUN OIL CO.

Crude Oil, Gas Naphtha,
Refined Petroleum, Gas Oil.

Toledo, O., and Pittsburgh, Pa.

Standard Oil Company,

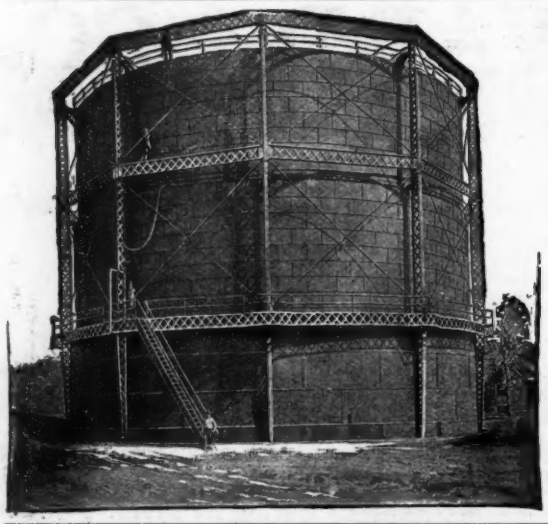
GAS NAPTHA DEPARTMENT.

GAS NAPTHA.

GAS OIL.

Correspondence Solicited.

26 Broadway, New York City.



DAVIS & FARNUM MFG. CO.,

WALTHAM, MASS.

Principal Office & Works, Waltham, Mass. Boston Office, R'm 18, Vulcan Bldg., 8 Oliver St.

Single, Double and Triple-Lift Gasholders of any Capacity. Tubular, Pipe and Sinuous Friction Condensers of all Sizes.

Steel Tanks for Gasholders, Iron Roof Frames and Floors, Purifying Boxes, Center Seal or Valve Connections, Bench Work, Reversible Lime Trays.

Self-Sealing and Pressed Steel Mouthpiece Lids.

Coke Barrows, Coal Wagons, and all Apparatus Requisite for a Complete Gas Works.

Also, Gas and Water Pipe, Flanged Pipe, Sugar House Work, and Special Castings of all Descriptions.

BAXTER & YOUNG,

CONTRACTING AND CONSULTING GAS ENGINEERS.

Examination and Values Ascertained of Artificial and Natural Gas Properties.

COMPLETE GAS WORKS ERECTED.

Artificial and Natural Gas Mains Furnished and Laid.

GAS PROPERTIES PURCHASED.

OFFICE: WAYNE COUNTY BANK BUILDING,

Rooms 201 & 202. DETROIT, MICH.

A. E. BOARDMAN, C. E.,

Consulting and Contracting Engineer.

Particular attention given to Gas, Water and Electric Plants. Long and successful experience with the problem and practice of

Filtration for Public Water Supply.

BREVARD, N. C.

Geo. Shepard Page's Sons.

GAS MACHINERY.

Correspondence Solicited.

180 Fulton Street, New York City.

DAVID LEAVITT HOUGH,

Consulting Engineer

AND

CONTRACTOR,

PARK ROW BUILDING, N. Y.

Practical Photometry,

By William Joseph Dibdin

Price, - - - - $3.00.

FOR SALE BY

A. M. CALLENDER & CO.,

No. 42 Pine Street, New York City.

KERR MURRAY MANUFACTURING CO.

Latest Design Rotary Exhauster, With Automatic Governor,

Single or Double-Lift Gasholders,

WITH OR WITHOUT STEEL TANKS.

Storage Oil Tanks, Condensers and Scrubbers.

Purifying Boxes, with Cover-Lifting Apparatus, Center Seal or Valve System Connections and Oxide Elevator.

REVERSIBLE WOOD PURIFYING AND SCRUBBING TRAYS.

Mouthpieces, Standpipes, Etc.; in Fact, All Classes of Ironwork for Benches.

DOUBLE GATE ALL IRON GAS VALVES, 3 TO 36 INCHES DIAMETER.

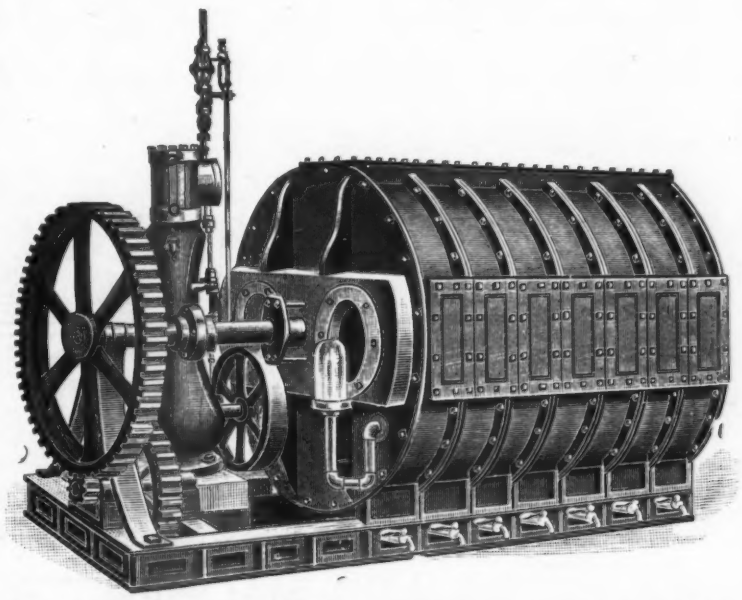
ALL SIZES OF STREET SPECIAL CASTINGS.

FORT WAYNE, IND.

BARTLETT, HAYWARD & CO.

BALTIMORE, MD.

Designers and Builders of Gas Works.



Sole Lessees the Wilkinson Water Gas Process.

PATENT STANDARD WASHER-SCRUBBER.

The best apparatus for the extraction of all Ammonia and a large proportion of Carbonic Acid and Sulphureted Hydrogen. The Scrubber has been materially improved and is provided with patented Wooden Segmental Grids, instead of Metallic Discs, thus reducing the weight on shaft and power for operating same.

Coal and Water Gas Installations of the Most Modern and Complete Types.

BENCHES WITH INCLINED RETORTS.

System Stettiner Chamotte Fabrik, Actien Gesellschaft, of Stettin, Germany.

GASHOLDERS OF ALL SIZES.

General Western Agents, THE LLOYD CONSTRUCTION CO., of Detroit, Mich.

QUINTARD IRON WORKS,

N. F. PALMER.

Foot of 12th St. & East River, New York,

MANUFACTURERS OF

GAS APPARATUS.

Complete Works Erected.

FREDERICK W. FLOYD, Engineer.

ALEX. C. HUMPHREYS, M.E., M. Inst. C.E. ARTHUR G. GLASGOW, M.E., M. Inst. C.E.

HUMPHREYS & GLASGOW,

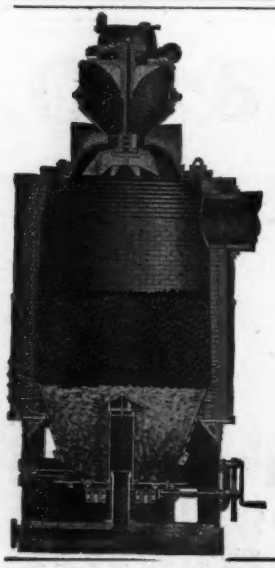
BANK OF COMMERCE BLDG., 31 Nassau Street, New York.

38 VICTORIA STREET, London S.W., England.

CONSULTING GAS AND ELECTRIC LIGHT ENGINEERS.

PROPERTIES PURCHASED.

COMPLETE EXAMINATIONS MADE.



R. D. WOOD & CO.,

400 CHESTNUT STREET, PHILADELPHIA,

—BUILDERS OF—

Gas Power Plants with Producers,

The best Producers for either Bituminous, Anthracite Coal or Lignite. Less labor required and less waste than in any other Producer. Send for Pamphlet. : : : :

CAST IRON PIPE.

HYDRAULIC TOOLS. HYDRAULIC OPERATING VALVES.

ISBELL-PORTER CO.,

ENGINEERS AND CONTRACTORS FOR THE

Construction and Extension of Gas Works.

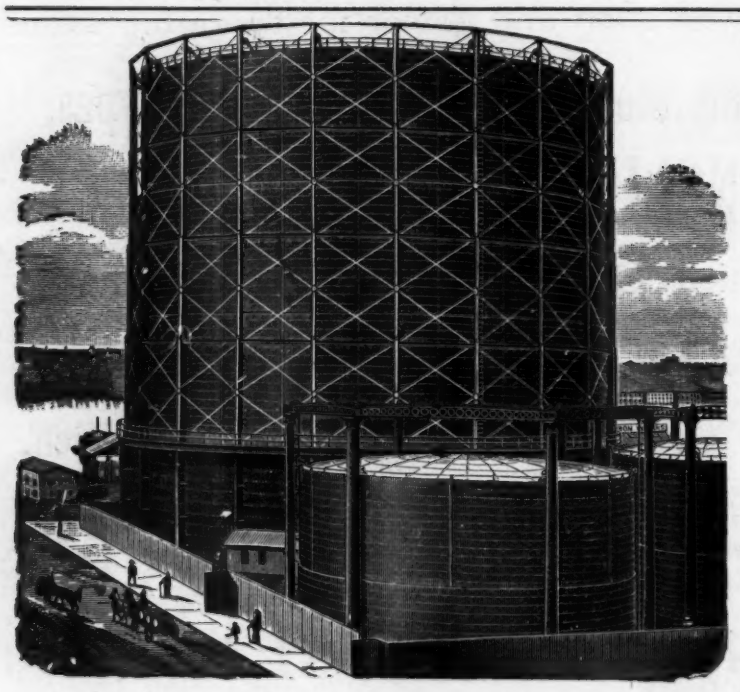
FOUNDERS AND MACHINISTS.

MANUFACTURERS OF

All Ironwork and Machinery Required in a Gas Plant.

Estimates, Drawings and Specifications furnished for the Alteration, Improvement, or Extension of Existing Works or the Construction of New Works.

245 Broadway, New York City. —OFFICES— **Bridge & Ogden Sts., Newark, N. J.**



The Continental Iron Works,

THOMAS F. ROWLAND, President.
WARREN E. HILL and CHAS. H. CORBETT, Vice-Presidents.
THOMAS F. ROWLAND, Jr., Secretary & Treasurer.

West and Calyer Sts. (Near 10th & 23d St. Ferries)
NEW YORK, Borough of Brooklyn.

BUILDERS OF

Gas Holders.

Single and Multiple Section Gas Holders a Specialty.

STEEL GAS HOLDER TANKS.

BENCH CASTINGS, RETORT LIDS.

Hydraulic Mains, Condensers, Scrubbers, Purifiers, Valves, Etc.

Self-Sealing Retort Mouthpieces & Lids

For Round, Oval, or "D" Retorts.

ILLUMINATING GAS! FUEL GAS!

THE LOOMIS PROCESS.

Now in successful operation at Works of John Russell Cuttlery Co., Turner's Falls, Mass., and Henry Disston's Son's Saw Works, Tacony, Pa.

The Cheapest Gas Generating System in the World.

Plans and Estimates Furnished.

BURDETT LOOMIS, - - Hartford, Conn.

The Gas Engineer's Laboratory Handbook,

By JOHN HORNBY, F.I.C.

Price, $2.50.

A. M. CALLENDER & CO. 42 Pine St., N. Y. City.

THE STACEY MANUFACTURING CO.,

MANUFACTURERS OF

Gasholders, Steel Tanks,

AND ALL IRONWORK & MACHINERY REQUIRED IN A GAS PLANT.

ALSO THE ONLY AUTHORIZED MANUFACTURERS OF

The Chollar System of Gas Purification.

OFFICES:

No. 239 Mill Street, CINCINNATI, OHIO. 'Phone, West 690.

PLANS, SPECIFICATIONS AND ESTIMATES CHEERFULLY FURNISHED.

RITER-CONLEY MFG. CO.,

GASHOLDERS, with or without Steel Tanks.

Purifiers, Condensers, Scrubbers, Oil Tanks, Smoke Stacks.

STEEL ROOFS and BUILDINGS.

PLATE AND STRUCTURAL WORK OF EVERY DESCRIPTION.

GENERAL OFFICE: Pittsburg, Pa. EASTERN OFFICE: 39-41 Cortlandt St., New York City.

WM. HENRY WHITE,

No. 62 Wall Street, - - - New York City.

ENGINEER AND CONTRACTOR FOR THE

ERECTION AND EXTENSION OF

GAS, WATER, AND ELECTRIC LIGHT WORKS.

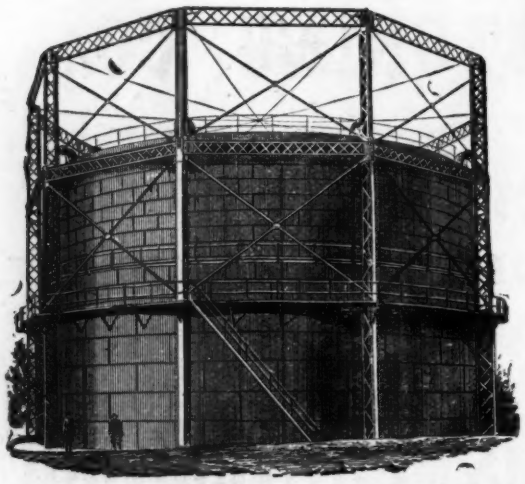
Correspondence with Gas Companies contemplating extending or improving their Plants respectfully invited.
Plans and Estimates Furnished.

1902 DIRECTORY 1902

OF AMERICAN GAS COMPANIES.

Price, - - - - - - - - $5.00.

A. M. CALLENDER & CO., - - No. 42 Pine Street, New York.



1842 ※ Deily & Fowler, ※ 1903

LAUREL IRON WORKS.

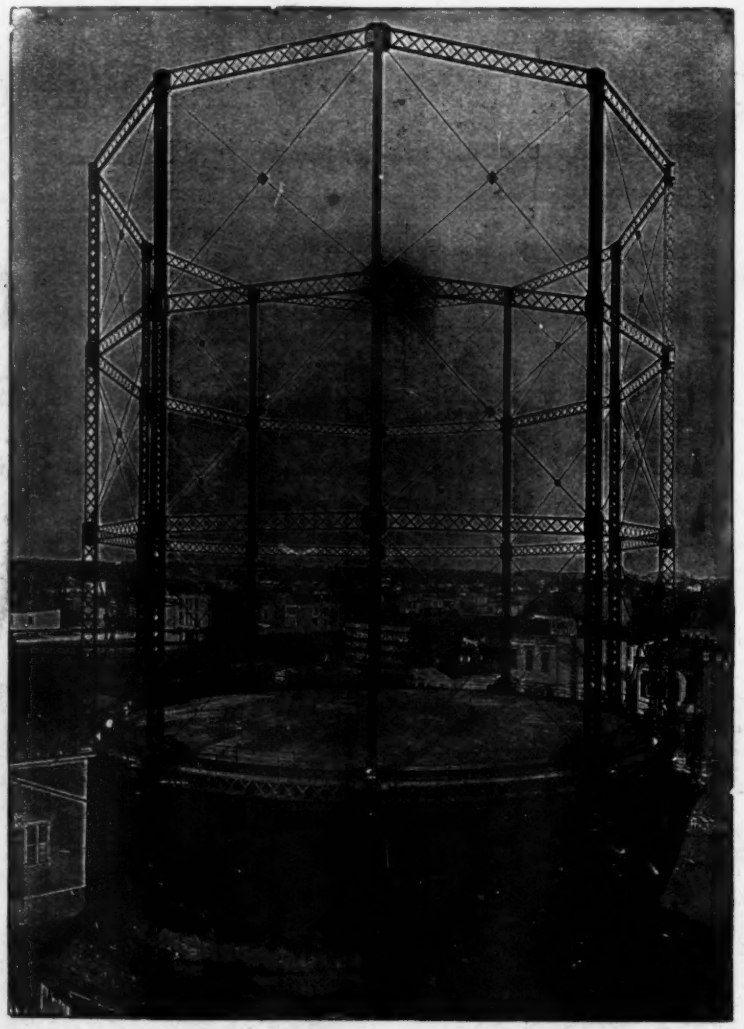
Office, No. 39 Laurel Street, Philadelphia, Pa.

BUILDERS OF

Gasholders

Single or Telescopic. With or Without Iron or Steel Tanks.

OIL TANKS, WATER TANKS, AND GENERAL WROUGHT IRON WORK.



The order for this Triple-Lift Holder and Steel Tank was received by the Logan Iron Works from the Union Gas Light Company, of East New York. The contract was completed and the Holder was in actual use in 90 days from receipt of order. Capacity of Holder, 500,000 Cu.Ft.

LOGAN IRON WORKS,

Brooklyn, N. Y.

MANUFACTURERS OF

Single or Multiple-Lift

GASHOLDERS,

Complete with Steel Tanks.

BENCHES, SCRUBBERS,
CONDENSERS,
PURIFIERS, IRON ROOFS,
Self-Sealing Retort Lids,
AND ALL PARTS OF
GAS WORKS APPARATUS.

Contractors for Complete Works.

ALSO, SOLE MANUFACTURERS OF

C. W. BLODGET'S
HOT GAS SCRUBBER.

Gas Analyst's Manual,

By JAQUES ABADY, M. Inst. Mech. E.

(Incorporating F. W. Hartley's "Gas Analyst's Manual" and "Gas Measurement.")

Ninety-three Illustrations and Nine Folding Plates.
Bound in Handsome Half Leather. Price, - $6.50.

FOR SALE BY

A. M. CALLENDER & CO., - - 42 Pine Street, New York City.

Established 1854.

D. McDONALD & CO.,

MANUFACTURERS OF

WET AND DRY METERS, STATION METERS AND METER PROVERS.

ALSO MAKERS OF

THE GLOVER PREPAYMENT METER.

The amount of gas delivered for the coin can be instantly and positively changed without removing the meter or replacing any parts.

The gas registered agrees absolutely with the amount purchased by the coin.

WE HAVE MADE AND SOLD IN THE UNITED STATES

OVER 120,000 OF THESE METERS,

ALL OF WHICH ARE GIVING PERFECT SATISFACTION.

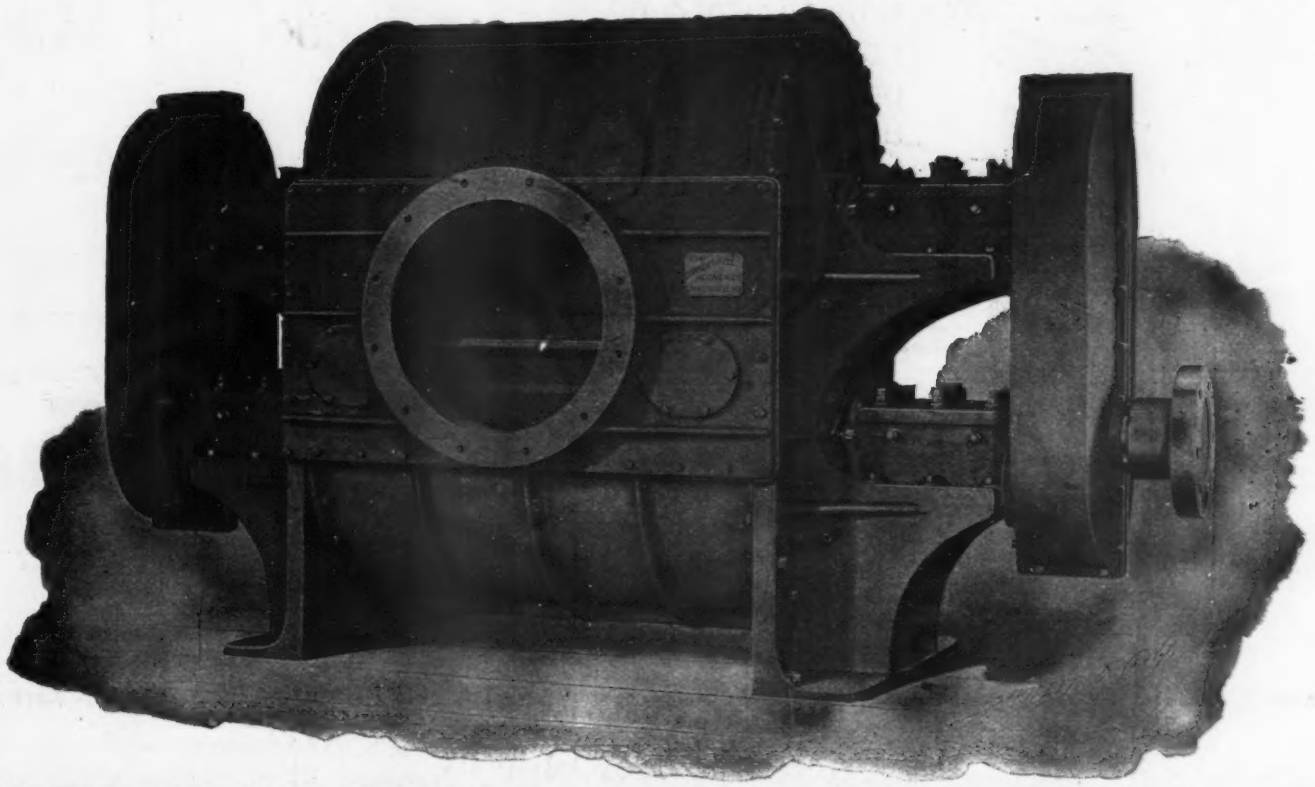
Correspondence Solicited.

561 West Forty-seventh Street, NEW YORK. | 51, 53 & 55 Lancaster Street, ALBANY, N. Y. | Jefferson and Monroe Streets, CHICAGO.

THE CONNERSVILLE BLOWER CO.,

MANUFACTURER OF

ROTARY POSITIVE PRESSURE GAS EXHAUSTERS, BLOWERS AND PUMPS.



HORIZONTAL OR VERTICAL, IN CAPACITY RANGING FROM 9,000 to 1,800,000 CU. FEET DISPLACEMENT PER HOUR.

CONNERSVILLE BLOWER CO., Connersville, Ind. EASTERN SALES OFFICE: 95-97 Liberty St., New York City.

NATHANIEL TUFTS METER CO.,

ESTABLISHED 1849.

8 MEDFORD STREET, BOSTON, MASS.

Consumers' Dry Gas Meters.
Station Meters of Any Capacity.

PREPAYMENT GAS METERS.

MARYLAND METER CO.,

BALTIMORE, North and Saratoga Streets. CHICAGO, 88 to 92 Jackson Boulevard.

CONSUMERS' AND STATION METERS, PRESSURE GAUGES, ETC.

SPECIAL ATTENTION GIVEN TO ALL REPAIR WORK.

"Have you Seen our Complaint Meter?"

ANTICIPATE YOUR WANTS

Just now, as the freight traffic is so congested it is no longer safe to count on a prompt delivery, then send us your orders for immediate attention, and we will fulfill your happiest anticipations.

KEYSTONE METER CO.,
ROYERSFORD, PA.

FIELD'S ANALYSIS
For the Year 1901.

An Analysis of the Principal Gas Undertakings in England, Scotland and Ireland. Being the 33d Year of Publication. Compiled and Arranged by

JOHN W. FIELD,

Secretary and General Manager of The Gas Light and Coke Company, London

Price $5. For Sale by

A. M. CALLENDER & CO., - No. 42 Pine Street, N. Y. City.

AMERICAN METER COMPANY,

NEW YORK, PHILADELPHIA, CHICAGO,
SAN FRANCISCO, ST. LOUIS.

PREPAYMENT METERS.

THEIR CONSTRUCTION IS SUCH THAT THEY MAY BE READILY READJUSTED WHEN THE SCALE OF GAS RATES IS CHANGED.

HELME & McILHENNY,

Established 1848. 1339 to 1349 Cherry Street, Philadelphia, Pa.

MANUFACTURERS OF

Wet and Dry Gas Meters, Station Meters, Provers, Gauges, Etc.

METERS REPAIRED

PREPAYMENT GAS METERS.

Our Own Patents. Strong. Simple. PROMPT ATTENTION. CORRESPONDENCE SOLICITED

METRIC METAL COMPANY,

MAKERS OF

GAS METERS for NATURAL and ARTIFICIAL GAS.

Special Attention given to Repairing METERS of all Makes.

FACTORY AT ERIE, PA.

EXCERPTS FROM DECISIONS

—OF THE—

BOARD OF GAS COMMISSIONERS of the COMMONWEALTH OF MASSACHUSETTS.

MR. E. H. YORKE, NEW HAVEN, CONN., Dec. 1, 1898.

Dear Sir:—I am in receipt of a copy of "Excerpts from the Decisions of the Board of Gas Commissioners," which is a handy compilation in book form of extracts from the most recent decisions of the Gas Commission of Massachusetts.

I note that most of these extracts are broad and safe-guiding precepts, which apply with equal force to one Company as to another. The 13 years' existence of the Board of Gas Commissioners with its unusual opportunities for acquiring information, have justly made it a high and safe authority in all matters pertaining to the management, obligations, and rights of Gas Companies. Your little book will serve as a valuable reference library in settling legal complications which often arise between a Gas Company and its customers.

Yours truly, (Signed) F. C. SHERMAN, Superintendent.

A 28-page Pamphlet containing the cream of this Board's decisions as to the proper management of Gas Companies.

Compiled by E. H. YORKE. Price $1.00. Address

A. M. CALLENDER & CO., No. 42 Pine Street, New York.

The Advertisement of

THE WESTERN GAS CONSTRUCTION COMPANY, Engineers and Builders,

Improved Double Superheater Lowe Water Gas Apparatus—Manufacturers of General Gas Works Machinery—Builders of Gas Works,

FORT WAYNE, IND.,

Occupies this Space
Every Alternate Week.

We are now recovered sufficiently from the effects of Our Recent Fire to fill orders promptly.

JOHN J. GRIFFIN & CO.,

1513-1521 RACE ST., PHILADELPHIA, PA.

NEW YORK:
559 West 47th St.

CHICAGO:
Jefferson and Monroe Sts.